Experimental geographies, artists, and institutions: spaces of and practices for knowing

Submitted by Dominic David Walker to the University of Exeter

as a thesis for the degree of

Doctor of Philosophy in Human Geography

in May 2017

I certify that all material in this thesis which is not my own work has been identified and that no material has previously been submitted and approved for the award of a degree by this or any other University.

Signature: …… (Dominic Walker)

Abstract

This thesis draws on previous engagements between art and Geography in experimental geographies to explore relationships between artists and different forms of institutions. It focuses on experimental artists and associated experimental artist-led collectives, which I term ‘artist-led groups’, to explore how these artists and groups have experimented with different forms of institutions’ as part of their work around science and technology. These experimental artists and groups draw on successive waves of institutional critique in the art world, alongside forms of social practice, to ask key spatial and social questions of institutions. This thesis explores the approaches these experimental artist-led groups and two other key artists have used to experiment with key facets of institutions, allowing them to ask critical questions of science and technology. In doing so, this thesis demonstrates creative approaches to engaging publics around science and technology which offer potential for expanding inter- and cross-disciplinary conversations in geographical discourse.

This thesis uses an experimental methodology combining a form of artistic practice as research method on the one hand and ethnographic methods on the other. It combines these methods as part of an ethnography to explore how these artist-led groups associate with one another in a social network. The thesis then focuses on two experimental artists in this social network whose works are becoming increasingly heard within geographical discourse.

These experimental artist-led groups and artists are shown to operate different creative approaches when engaging with institutions. I show these in three ways, showing how 1) artist-led groups experiment with different modes of institutions to bring contemporary science and technology issues into the public realm; 2) experimental artist Neal White uses artistic experiments to critique science and technology; and 3) experimental artist Richard Pell uses his Center for PostNatural History to experiment with ways of prompting public discussions around science and technology. Accordingly, this thesis argues that these experimental engagements highlight the benefit of inter- and cross-disciplinary conversations in better understanding and shaping institutions. For geographers, this experimental approach can create novel forms of knowledge to help better understand the social nature and implications of institutions.

Acknowledgements

Here commences the impossible task of chronicling everyone and everything which led me to this momentous occasion of a Ph.D. submission. This research would not have even commenced had it not been for an incredibly fortunate series of events culminating in the University of Exeter's College of Life and Environmental Sciences funding this project. I am very grateful to the University of Exeter for such a wonderful opportunity for me to explore a topic which was – predominantly – beautifully enchanting and intellectually stimulating.

I want to pay special mention to Professor Gail Davies, my primary supervisor. She saw a potential in me beyond my perceived capabilities, and was the sole reason the CLES funding opportunity materialised in the most serendipitous of circumstances. To her belief in me, her emotional and professional investment, and her sharing of expertise I am forever indebted. Prior to this, my passion for intrigue's moulding into something of academic value must be attributed to Professor Deborah Dixon and staff at Aberystwyth University's Institute of Geography and Earth Sciences, notably Professor Matt Hannah whose second-year lecture was a key component in luring me from the physical sciences to human geography.

I must also acknowledge the salient contributions both Prof. Davies and my secondary supervisor, Professor John Wylie, have made throughout the process. Both have offered insightful, helpful, and frequently patient feedback on copious words of often unpredictable quality. They have been friendly, warm, and understanding in all circumstances ranging from the lowest ebbs to the most enthralling crystallising moments, and our good-natured meetings and personal friendship will be fondly remembered.

My thanks go to those who participated in the research process. Notably, to Neal White and Richard Pell, both of whom gave me fantastic support, insight, perspective, and access well above and beyond the call of duty. The effort Richard went to during my Pittsburgh stay, and the continuing contact with Neal were both key to my fieldwork being the enjoyable and empirically-rich experiences they were. They also gave permission to use their images, for which I am grateful. Thanks also goes to the other key figures in my research's story on both sides of the Atlantic,

including Steve Kurtz and Steve Rowell, both of whom were fundamental in helping me find how deep the conceptual rabbit hole went.

My family have been so consistently supportive and understanding it's easy to forget how solid they have been. To my parents, brothers, grandparents, step-relatives, and others implicated in the whirlwind of my family, I'm enormously grateful for your love and encouragement. To my partner, Rachel, who was thrown into the thesis experience as the writing up began: you kept me focused, human, and diligent, and your love and support helped me across the finish line in some testing circumstances. You have been an absolute diamond.

I am deeply thankful to the fantastic staff and postgraduates at Exeter I've been lucky enough to share my time here with. Each, no matter how small or large, has played their part and it is not a part forgotten. Staff have helped ensure I maximised my time in the department, and special thanks goes to Stewart Barr who I was grateful to share many fantastic teaching experiences, personal mentoring and cake stops with. I also want to place on record, my thanks to Sean Carter, Pepe Romanillos, and Jen Bagelman for their part on a fantastic Berlin field trip in 2017 which helped re-charge my thesis batteries at a crucial time.

The Ph.D. experience plunged me, at some stage or another, into every emotion on the spectrum, and my gratitude is extended to friends far and wide for keeping me balanced, upbeat and (relatively) sane. Special mention goes to Jamie, Anna, Gary, and Katie, for welcoming me into what became the best row in C360; to my writing retreat buddies Holly, Simon, Sarah, and Lilo who I had many a fantastic time with in Cornwall and beyond; and to Nicole, Rob, Alex, Fran, Sarah H, Diego, Patrick, and Andy W have also been wonderful in their solidity, humour, and general merriment I've had with them to differing degrees. Completing my Ph.D. simply would not have happened otherwise, so a huge, huge thank you to you all for your friendships.

Contents

List of Figures

List of Tables

List of Acronyms

AAG – American Association of Geographers

APG – Artist Placement Group

AWTY – *Are We There Yet?* project

BAFTA – British Academy of Film and Television Arts

CAE – Critical Art Ensemble

CAFO – Concentrated Animal Feeding Operation

CLUI – Center for Land Use Interpretation

CMU – Carnegie Mellon University

CoC – *Centre of Centres* project

CPNH – Center for PostNatural History

DSTL – Defence Science Technology Laboratory

LSRC – Land Systems Reference Centre

ISSEE – International School for Security and Explosives Education

MJT – Museum of Jurassic Technology

OOE – Office of Experiments

ORP – *Overt Research Project*

RGS – Royal Geographical Society (with the Institute of British Geographers)

SEC – *Sites of Excavation and Construction*

STS – Science and Technology Studies

UCL – University College London

‘[W]e thought artist meant […] the kind of western idea: making pictures on walls. But now we know, again, ‘artist’ means bigger than that. It means we can *shape our world*!’ (Cook et al., 2000: 342).

Figure 1 – The Void at the Barbican gallery, London, 2005[1]

[1] Image source: http://www.nealwhite.org/self-experiment.html.

Arriving at the Barbican art gallery in London and following the signs to a mysterious project being exhibited – 'The Void and the Self-Experimenter' – presents an unexpected spectacle. There are people mingling, some chatting, and some observing what appears to be an erected transparent inflatable chamber sitting off-centre on paving tiles. It's interspersed among trees in the open area. Inside, a man in white wearing a white face-mask prepares small blue pills. On the approach to this transparent chamber, he stands up, carrying a tray of these pills over to an opening in the plastic. He extends his hand in anticipation of receipt, presumably in exchange for a curious pill. What does he want me to do? What's going on? The situation seems utterly bewildering. People around seem unfazed holding cyan cocktails in elongated tumblers in their hands. Some have drunk more than others. Others don't have any tumblers. Have they already drunk theirs or have they not taken one? What is going on here? Who is this scientist? What is this pill? Why are people drinking a fluorescent cocktail dispensed by an unknown person in an inflatable transparent chamber in an art gallery? What is in this cocktail? What does it do? How can you tell? Who is this man? Can you trust him? Why are these pills – and presumably a scientist – in an art gallery? A drink might take the edge off such confusion – one cocktail, please?[2]

[2] This is an extract from my field diary. All other field diary extracts in this thesis are italicised.

1.0. Experimental geographies and artist-led institutions: engagements with science and technology

In this thesis I explore artist-led groups[3] and two individual artists, whose work involves science and technology, and consider their relationship with contemporary experimental artistic practice[4] and emerging developments in experimental geographies.[5] Experiments are happening *to* humans on a planetary scale, such as through climate change, and being initiated *by* humans, such as in the computer models run to try and *understand* climate change (Latour, 2004). Experiments are increasingly tools for thinking through interpretations of – and a mode of operating in – the contemporary world. As developments in science and technology become increasingly complex, so experiments, too, become ever-more complex. They are getting broader and involving more processes, the implications of these holding potential for shaping future attitudes, beliefs, cultures, and even human physiology. From developments in renewable energy, nanotechnology, gene editing, and synthetic biology, to 3D printing, autonomous vehicles, and advanced artificial intelligence, experiments have a profound effect on our species, societies and spaces. Experiments can be seen as enacting change, and are implicated in forms of world-making courtesy of 'a trial or a venture into the unknown' (Gross, 2010: 4).

[3] Throughout this chapter I term the artist-led organisations, institutions, collectives and co-operatives as 'groups', drawing on Latour's (2005a) reasoning, who argues '[t]he word 'group' is so empty that it sets neither the size nor the content. It could be applied to a planet as well as to an individual; to Microsoft as well as to my family' (Latour, 2005a: 29). For this reason, '[t]his is exactly why I have chosen it' (Latour, 2005a: 29). For many of the groups, being termed an institution might undermine their work's riposte *against* institutions, so the malleability and polymorphous nature of 'group' avoids portraying them as fraudulent.

[4] Throughout this thesis I refer to art without a capital 'A', different to my referring of 'Geography' with a capital 'G'. This is to demarcate my conceptions of art from those of Geography. By not capitalising 'art', I acknowledge its existence beyond academia, as a method of the world involved in academia rather than *of* academia. It distinguishes itself amongst other disciplines and eschews the disciplinary containment applied to other disciplines such as Geography. Art has no disciplinary confines and never seeks to. I intend not to hierarchise one over the other, but to recognise the differences in scope, audience, engagement with, and understanding of, the two schools of thought.

[5] I use the term experimental geographies to identify a body of work (see Last, 2012b; Paglen, 2009b) which is unbounded (Last, 2012b). However, experimental geographies, according to Last (2012b) has two constituent parts to it which involve the *geographies of experiments* and *experimental geographies*. To avoid confusion, I therefore use experimental geographies in standard font to refer to the body of work and the italicised *experimental geographies* to refer to the entity comprising a part of the body of work. I do not intend to imply a singularity or amalgamate the two; to do so would be a dis-service to what is a highly complex and polymorphous term.

At this juncture in human history, humankind is approaching several key challenges on several levels. Climate change, for example, has commenced in earnest (McKibben, 2017) and threatens every facet of contemporary Western culture, making it a social, cultural, political, and economic crisis, in addition to an ecological one. Climate change is one example of a crisis emanating from political decisions both past and present; the same political decisions which also present humankind with other upcoming social challenges such as record levels of financial inequality (Monaghan, 2016) threatening physical and mental well-being, alarming inequality among sexes and races, peak energy (Friedrichs, 2011), and peak population (Lutz et al., 2001). These are dangerous times which could threaten humanity's very existence (Brannen, 2017) if poor decisions are made which fail to neutralise these challenges.

Set against this urgency and wider political backdrop, the stakes – and rewards – of experiments have never been higher. In the UK and US, the Brexit and Trump victories – both of which expressed sentiments lambasting science and 'experts' – highlight the current complexities, difficulties and distrust in disseminating science and knowledge to the public. Combined with public confusion over the recently popularised term 'fake news' (Hunt, 2016),[6] there exists a real threat to public understanding and trust of science and forms of knowledge. Challenges such as these are creating new demands of the formal and informal institutions which influence knowledge production, decision-making, and modes of action.

For Joselit (2017), this politicisation of information creates opportunities around the production of knowledge. These opportunities, Joselit asserts, can be creatively engaged with, such as through art where it can act as 'a resource for working out a […] formal theory of information' (2017: 14). Art, for Joselit, can contribute to and utilise different 'species' of knowledge, which can offer new forms of engaging with and contributing to understandings of knowledge. For Braun (2015), these opportunities for new forms of thinking necessarily entail experiments, and mark a crucial deviation from critique. Experiments, he argues, provide these opportunities, which artists, among others, can capitalise on; rather than critiquing the existing,

[6] This term has been hijacked by Trump and his supporters to discredit knowledge or claims Trump disagrees with.

experiments can be tools for developing new modes of thinking. ‘The turn to experimentation […] shifts attention’, Braun argues, ‘beyond critique to practices of composition through which difference can be identified and new knowledges and political possibilities generated’ (Braun, 2015: 112). In light of recent political decisions won on the back of (media dubbed) ‘post-truth’ (Flood, 2016; Norman, 2016; The Economist, 2016) promises displaying a woeful disregard for reasoned debate and scientific consensus, it is clear that now more than ever in these unsettling times, these new knowledges and political possibilities Braun speaks of are essential to understand, grapple with, and take control of contemporary experiments in the 21st Century.

This thesis therefore explores how and why experiments are used through and in contemporary experimental artistic practice. I do this by looking at institutions, which, through their social constitution and physical enactment, highlight two key aspects of experiments: their sociality and spatiality. By exploring ‘sociality’, I refer to the experiment’s ‘who’ questions, such as who gets to experiment, who is implicated by them, under whose authority do they take place, and for whose attention are they enacted? In considering ‘spatiality’, I ask the experiment’s ‘where’ questions, such as where are experimentation’s metaphorical and physical spaces, where do experiments run and end (Davies, 2010; Schaffer, 1995), and where might the effects of experiments be felt? These aspects help address the implications of questions around experiments through and in artistic practice.

As the opening vignette alludes to, artistic practice is unafraid of asking questions other practices might be uncomfortable asking, such as questions of institutional protocol. *The Void and Self-Experimenter* was an artistic experiment re-staging Yves Klein’s *Le Vide* (1958) project, and sought to question how and where experiments are permitted at the boundaries of art and science (White, 2014). Artistic practice asking questions of institutions can, as *The Void and Self-experimenter* shows, seem disconcerting, and even bewildering for those unsuspecting. Questioning institutions, after all, means questioning the expected and assumed, disrupting the routine, and prompting reflection on contemporary institutions, which have implications for science and ethics. In asking questions of institutions, artistic practice questions processes of knowledge production, contributing vibrant, fertile spaces for

conversation, using projects to stimulate conversation to help make sense of the contemporary world.

In this thesis, I identify and engage with what I consider to be key artist-led groups experimenting with and through institutions. These artist-led groups use experimental artistic practice to engage with institutions as part of a critical discourse around science and technology. I identify these groups and engage with their practices, alongside more in-depth ethnographic research with two key artists in conversation with these groups. These two artists are Neal White and Richard Pell. Both of their work concerns science and technology, but in different contexts. White uses site and notions of a social imaginary[7] of science to draw attention to our critical practices within science and the physicality of experiments in the world. Pell bases conversations of power, science, and technology around a physical institution dedicated to questioning humankind's relationship with the living world. In doing so, he asks questions of the role of institutions – such as museums, in Pell's case – in prompting public discussion of science and technology. Both White and Pell also have engagements with Geography, making their work a valuable site for exploring this thesis' concerns.

In using institutions I use a term highly complex and multi-layered that is spatially, socially, and culturally determine I therefore have to engage with it on defined terms.[8] This thesis considers institutions to be social collectives with sets of normalised protocols and practices as developed, maintained and tweaked over time. Accordingly, institutions are socially determined, as are the protocols and practices associated with them. As such, they can be altered, change significantly in size, or even collapse altogether. Individuals, then, act as 'active subjects, as agents rather than as passive dupes' (Foucault, in Mills, 2003: 34). Institutionalised protocols and practices relate to spaces associated with them which come to imbue

[7] I consider the term 'social imaginary' to relate to what publics *perceive* institutions to be, and what they conceive of them.

[8] This is in contrast with my reasoning behind using the term 'groups', as outlined in footnote 3. Using a term as fluid as 'groups' is beneficial in allowing nuances of collective understandings and practices to emerge without unnecessary shackling. It also provides a term with such a loose meaning it highlights commonalities between collectives yet allows their ideas to emanate without shackling under incorrect labels.

the institution, such as the laboratory (Thrift et al., 1995) for different scientific institutions during the 20th Century.

In particular, the thesis engages with institutions artists have involved themselves with as a means to discuss, critique or work from a parallel position to science and technology. The thesis explores different modes of institutions; in some cases the thesis engages with particular institutionalised practices and protocols such as the (narrow and/or institutionalised) distribution of (different kinds of) expertise, while in others it relates to key institutional spaces such as museums.

Additionally, the thesis works alongside artists who have different relationships to (different kinds of) institutions, such as working inside, critiquing or creating a new institution in response to them. It is here the ambiguity – and to an extent fluidity – of the term 'institution' is advantageous, allowing me to frame the artist-led groups' and artists' practices in this thesis according to their interpretation, emphasis, and engagement with institutions rather than attempting to shackle or erroneously mis-identifying their work.

To this end, I, like Foucault (1980a), seek to highlight the sociality of institutions, as a set of practices made and re-made for a particular purpose. I, and the artist-led groups and artists I explore, argue that these groups and artists highlight the social comprisal of institutions from the bottom-up by employing social practice, a term I discuss in more detail later in this and the next chapters.

These artist-led groups, White, and Pell each offer a different engagement with institutions and experiments, presenting a different opportunity to engage with experimental geographies. In studying these artist-led groups engaging with institutions to contribute to conversations about science and technology, I explore how these groups *experiment* with institutions, and what impact this has for the discourse around science and technology. Engaging with White allows me to explore key specifics of institutions he *experiments* with, namely site and the social imaginary of science. Additionally, Pell uses experiments differently to both White and these artist-led groups, instead using his institution, the Center for PostNatural

History,[9] to experiment with different ways of invoking public discussion of science and technology. So each of these actors[10] – the artist-led groups, White, and Pell – use experiments in a different way, each contributing to experimental geographies. I can then use these contributions to show their engagement with different aspects of science and technology as an example of how questioning the processes of knowledge production can lead to new forms of knowledge.

This introductory chapter outlines the key elements of the thesis. It firstly positions the thesis in recent literature concerning experimental geographies[11] (Kullman 2013; Last, 2012b; Paglen, 2009b), a branch of Geography emanating from the recent 'experimental turn' (Braun, 2015; Powell and Vaseduvan, 2007) in the social sciences. This mirrors changes within the social sciences of increasingly perceiving experiments as more open-ended, less rigid and more open to other practitioners than previously considered to be, outlining how these changes in perception have come about.

I then show how this thesis contributes to existing conversations between artists and geographers in recent geographical conference conversations and in developing new research areas. Two significant contributors to these conversations are artists Neal White and Richard Pell, both of whom engage with experiments in different guises, and both of whom geographers have previously begun to work with. I then contextualise White and Pell respectively, outlining their practices, research areas, key projects, and how I engage with them in this project, notably through engaging with their use of the concepts and practices around institutions. Finally I outline each chapter in the thesis in turn, with regards to purpose, structure, and conceptual content, summarising the contribution each will make within the wider thesis.

[9] This is explored later in this chapter, and in much greater detail in Chapter Six.

[10] By the term 'actor', I refer to an individual's ability to act – that is, exercise the philosophical interpretation of agency – within a given network (see Latour, 2005a for a good introduction to Actor-Network Theory).

[11] Paglen (2009b) and Thompson and ICI (2009) share ideas relating to experimental geographies but does so under a bounded term of 'Experimental Geography'. I reject this term, arguing that part of experimental geographies' attraction and complexity relates to it being an unbounded, sprawling body of work, which is inclusive and welcoming. To demarcate as a fixed, bounded capitalised discipline, I argue, therefore negates the essence of experimental geographies' strength.

1.1. Recent engagements with experiments in Geography

Recent human geography literature speaks of an 'experimental turn' (Kullman, 2013; Last, 2012b; Powell and Vaseduvan, 2007; see also Braun, 2015; Hawkins, 2011a; Davies, 2010; Gross, 2010; Ronell, 2003) in the social sciences. This turn, for Braun (2015), represents a 'shift toward experimentation as a new critical […] practice' (2015: 103), of experimenting as enacting new ways of thinking beyond critique. For Braun, this experimental turn emerges from an increasing disillusionment with critique in the social constructivist sense, igniting calls for more 'experimental' and 'creative' engagements to produce new conceptions of the world.[12] These conceptions are borne out of *situations* forcing thought from individuals brought together around a situation to think collectively and respond to it, rather than key individuals or 'experts' forcing thought on a particular situation. Solutions to situations therefore become more concerned with feasibility than whether contributors are 'experts'.

Braun draws on Whatmore and Landström's (2011) example of implementing such an experimental approach to a flooding situation in the UK. Referring to their work, he highlights experiments as producing '…something akin to a 'redistribution' of scientific and political capacity, achieved by enabling a situation to disrupt an established order of thought and produce *new* possibilities for knowing and acting' (Braun, 2015: 105). Experiments are thereby increasingly considered a tool by which modes of thinking, interpretation, and institutions can be critiqued, by seeking an iterative form of experiment (see Davies, 2010) rather than one with the same apparatus and expected outcomes. Following the experimental turn, a fundamental re-conception of experimentation in the social sciences differentiated the term for human geographers from that of positivist scientists (Braun, 2015). Braun argues experimentation for human geographers 'refers less to the empirical testing of theory, such as in positivist science, and more to practices of composition that are meant as ventures into the unknown' (2015: 113).

[12] I draw on Kukla (2000) to consider 'social constructivism' to mean that general understandings of the world are accepted by people regardless of whether they actually *are* as they are claimed to be. Prior acceptance constitutes not just perception, but how things exist; that is, accepting how they are determines their existence (see Kukla, 2000). For an overview of social constructivism, also see Law and Singleton (2000).

These ‘ventures into the unknown’ (ibid) mean ‘we cannot know where [the experiment] is going’ (Ronell, 2003: 563). Experimenting, then, offers an opportunity to explore the unknown rather than test theories such as in positivist science. Fundamentally, experiments, for Butler (2002), can help forge a new form of critical practice which avoids simply integrating its thoughts back into the frameworks it aimed to question (Braun, 2015). As such, artists, geographers, and other practitioners have begun to use experiments to engage with complex topics – such as those in science and technology – providing a licence to explore new identities, relationships, and forms of responsibilities.

Usefully, experiments are used by both artists and scientists under the auspices of the same term. For artists, experiments also represent an opportunity to undertake novel approaches to problems and ideas, or to help refine areas of study or knowledge by using the ‘shape’ of the experiment to identify (social) reactions (e.g. White, 2014). Yet for scientists, the term ‘experiment’ can legitimise what has historically been a playful adventure as part of ‘chaotic’ and ‘creative’ investigations, especially in the 19th Century (Marvin, 1988).[13] Experiments, then, possess a novelty and creativity to them, regardless of whether they are undertaken in artistic or scientific domains.

Within Geography, geographers’ have sought to exploit this novelty and creativity by engaging with experiments under the banner of experimental geographies (Last, 2012b). This relationship between geography and experiments has multiple questions and implications. In what follows I want to identify three distinct but interrelated dimensions around: knowledge production, space, and the social. Firstly, regarding contemporary knowledge production, experiments are seen to be conducted in the ‘wild’, i.e. the non-laboratory setting (Lorimer and Driessen, 2014). This openness of an experiment in the ‘wild’ (Lorimer and Driessen, 2014; see also Callon et al., 2009; Wynne, 1992a) is a typical factor *in* – and draws attention *to* – the changing concepts in contemporary knowledge production, moving away from fixed parameters in a measured, secluded space (Callon et al., 2009).

[13] See Enns (2013) for a good example of such experiments; he highlights Louis Darget and Edouard Baraduc’s attempts to photograph thoughts in the late 19th Century.

Geography's engagement with experiments has sought to reflect this fundamental knowledge production change – as evidenced in geography's use of the term 'experiment' (see Davies, 2010; Gross, 2010; Powell, 2007; Powell and Vaseduvan, 2007; Hinchliffe at al., 2005) – where experiments are being conceived of as iterative processes (Davies, 2010). Such diverse literature reflects the range of experiments being undertaken across a breadth of topics, from re-wilding (Hinchliffe et al., 2013; Collard, 2014) to art (Last, 2012b; Kerr, 2008). These literatures act as anchors of knowledge from which to explore further (Gross, 2010; Macdonald-Munro, 2004). A good example is in White's *The Void and the Self-Experimenter* (Triscott, 2012) which took Klein's project and employed it again but under different conditions to see what happened. Other experiments might even attempt to find their way in completely new settings without drawing on previous results (Ronell, 2003), such as Angela Last's (2012a) *Mutable Matter* project which sought to initiate conversations from an open project outline as a way to ignite a cross-disciplinary conversation with non-scientists about nanotechnology.

Recently, the novelty and creativity of experiments are being expressed in different ways in Geography. One way is to draw on the understanding of experiments in the arts, and the other is recognise the changing epistemology of experiments from the physical sciences. Geography is increasingly looking to integrate both the novelty and creativity of experiments with the nuanced 'iterative' notions of experiments within its approach. As creative and novel ways of thinking have become increasingly engaged with from within Geography – such as following the 'cultural turn' of the 1980s and 1990s (Wylie, 2005; Kwon, 1997; Daniels, 1993), and the current 'creative (re)turn' in human geography[14] (Hawkins, 2015; DeLyser and Hawkins, 2014)[15] – so geographers have sought to fold creativity into thinking around particular areas. One of these areas is experiments, which act as opportunities for integrating this creative potential.

For some people, therefore – like artists such as Iain Kerr (2008) – contemporary experiments, such as those increasingly engaged with in Geography, are positive.

[14] The 'creative (re)turn' is a movement which developed from successive waves of critical engagement with culture and creative thinking tracing back to the cultural turn.

[15] I discuss both the 'creative (re)turn' and the 'cultural turn' in more detail in Chapter Two.

Kerr argues forms of acting and researching require acts of experimenting for it to be classed as 'research' (Macdonald-Munro, 2004). For Kerr, to act or to conduct 'research is to be involved in change – experimental change. We need to recognise that acts of knowing are forms of change' (Kerr, 2008: 65). These acts and research become less about what can be *known* abstractly in a precise, controlled environment and are instead more about open, inviting experiments. This reflects a use of experiments as tools to help better *understand* the world, rather than as confined to a laboratory and parachuted into non-laboratory settings with expectations of similar outcomes (Wynne, 1992a).

For artists, this knowledge becomes more about 'creative forms of world-making' (Davies 2011: 268; see also Schaaf et al., 2017)[16] rather than anything refined, controlled or precise. Or, as Ronell (2003) summarises, '[t]he experimenter must give up any secure anchoring in a homeland, allow [themselves] to be directed by an accidental current rather than aiming for a pre-established goal' (Ronell, 2003: 568). These new understandings of experiments relate to the open-ended aspect[17] of a concept previously most fully studied through a focus on rigour, precision, quantification, reduction, and control. These new understandings consider experimentation to be a way-finding tool, a framework to conceptualise new ways of knowing and experiencing in the world, embracing complexity and augmenting previously understood 'experimentation' accordingly (Hinchliffe et al., 2005; Stengers, 1997).

For others, however, this shift in experimentation is more troubling. Experimentation's traditional understanding was markedly different, using experiments to answer clearly defined questions, using quantified variables, testing solely for what's sought out. In his account of how scientists previously used experiments, Popper comments:

> '[T]he theoretician puts certain definite questions to the experimenter, and the latter, by [their] experiments, tries to elicit a decisive answer to these

[16] Schaaf et al. (2017) argue that modes of creative 'world-making' allow for 'deep engagements' (2017: 320) in their work on encountering places in different ways in an art-Geography collaboration.

[17] Rheinberger (1997) discusses this in his notion of the 'experimental system', which I come on to discuss shortly.

questions, and to no others. All other questions he [sic] tries hard to exclude' (Popper, 1968: 107).

Devising any experiment, it might be argued, requires framing and setting precise, distinct parameters to ensure a progression of something monitored, measured, and a comparative outcome such as numbers or graphs (Rheinberger, 1992). Rheinberger (1997) outlines the 'experimental system' which, he argues, devises the form of any experiment. For Rheinberger, this system is comprised of two constituents. Firstly, the technical object. These tend to be 'characteristically determined within the given standards of purity and precision' (1997: 29), representing the experiment's apparatus and its application as passed down through standardised protocol. The second constituent is an epistemic thing, which is the process or entity being studied, such as a chemical reaction or biological function. They're the 'things' the experimenter seeks to find out about. Epistemic things represent the poorly understood part of the experimental system alongside the more well-known and rigorously defined technical object. Experimental conditions are provided by the technical object and the epistemic things are traced for producing new knowledge.

Acknowledging this balance between standardised protocol and the production of new knowledge, Braun (2015) argues for caution when engaging with experiments. They should not be embraced 'as the solution to the apparent exhaustion of critique' (2015: 112), and argues it should be used only under certain conditions. For Braun, 'we might instead ask: under what conditions of knowledge and existence does experimentation become a necessary form for the management and administration of individual and collective life?' (2015: 112). Experiments involving science and technology can therefore become difficult because of firstly the (subject) matter involved and secondly the risk of attempting to understand traditional experiments embedded from science and technology studies (see Callon et al., 2009; Jasanoff, 2006 for example) through *new* conceptions of experiments.

Open experiments, meanwhile, seek to embrace change and instability as part of encouraging novel and creative forms of knowledge production (Davies, 2010; Davies and Dwyer, 2007; Schaffer, 1995). However, this openness can be perceived

as lacking rigour in the technical objects or only seeking epistemic things. It might invite doubt into what variable had what effect, questioning the substance of an artistic approach to experimenting. Last (2012b) argues some might see 'a danger of not arriving at anything at all' (Last, 2012b: 716). Such previous understandings of experiments can therefore level a criticism Last (2012b) summarises as '[i]f one does not agree on the experimental parameters of the experiment, how can one gauge the attempted contribution?' (Last, 2012b: 716).[18]

Secondly, this experimental shift also relates to the organisation of space. Where do contemporary experiments happen and how might this be changing? 'Traditional' understandings of experiments saw them as seeking placelessness[19] (Kohler, 2008; 2002a; 2002b; 2002c), and attempted this by controlling the conditions in a secluded, quantifiable environment (Davies, 2011) such as a laboratory (Callon et al., 2009; Latour, 1988). This precision, and quantification (Rheinberger, 1997; 1992) indicates known, repeatable conditions for future repeated, identical experiments. Set-up in this way, experiments could have a clear and defined cessation, and with results clearly distinguishable. Cause-and-effect relationships could be posited by identifying and measuring the variables involved.

However, cessation (Davies, 2010) and an understanding of what *caused* what in an experiment (Rheinberger, 1993) are, for Rheinberger, not meant to be decisive. As Rheinberger (1997) argues '[r]esearch systems are tinkered arrangements that are not set up for the purpose of repetitive operation but for the continuous re-emergence of unexpected events. Experimentation, as a machine for making the future, has to engender unexpected events' (Rheinberger, 1997: 32-3). Experiments, according to Rheinberger, are not set up for repetition but instead to seek the unexpected as part of a continuous process.

[18] However, such a refined, quantifiable approach assumes the only valuable outcomes to be numerical. Outcomes could, instead, be 'measured' by personal experience, contribution, and interpretation of considering conversations fruitful or not, situations which might lead to collaboration or a sharing of ideas not readily quantifiable. A qualitative approach to outcomes, then, might leave the open-endedness intact yet still yield a clear contribution (see Lane et al., 2011).

[19] Placelessness is understood by Kohler (2008; 2002a; 2002b; 2002c) to mean an ability to be repeated anywhere.

Increasingly, there has been an amplified awareness of a move from experiments conducted in refined, laboratory spaces[20] to much larger-scale experiments of encompassing multiple variables. Latour (2004) argues the 21st Century has brought challenges such as climate change and political uncertainty, increasingly presenting the world as a one-to-one scale experiment, one where each person is both the experimenter and the experimented upon. Each person – willing, knowing or neither – is implicated in these experiments, the global scale of such experiments involving multiple and complex assemblages of variables. Experiments span all scales, including the national (Ronell, 2003) and the global (Yusoff, 2007), rather than within fixed laboratory parameters.

Lorimer and Driessen (2014) reflect on geographers' use of experiments, presenting a representation of experiments' complexities in the 'wild'. They describe engagements with unforeseen matter, people, and ideas not in the original set-up of their broad, wildlife experiment in the Oostvaardersplassen. Lorimer and Driessen's site at Oostvaardersplassen was a complex assemblage of other animals, living matter, and non-humans, which wandered in and out during the experiment. For them, engagement with matter unaccounted for in the original experiment emblematised a more accurate representation of experiments in the 'wild'.

Aside from a re-conception of contemporary knowledge production and the organisation of spaces, a re-configuration of experiments also then asks, thirdly, who gets to (take part in) experiment(s). While previous experiments were restricted to the laboratory's confines, only a select number of 'expert' experimenters operated apparatus and run the experiment. However the distribution of expertise has become more diverse as experiments' scale and complexity has grown. Expertise has become increasingly distributed, on one level from a greater sharing of knowledge (such as through the internet), and on another level from a wider acceptance of different conceptions of what constitutes knowledge and expertise (see Kerr, 2008). More people can be considered an 'expert', more people can experiment, and across more scales (Latour, 2004) in spaces no longer reserved for 'experts'.

[20] Results from these refined, laboratory spaces are often attempted to be extrapolated and applied in 'real world' non-laboratory settings, ignoring their complexities (see McCormack, 2010; Callon et al., 2009; Wynne, 1992a).

Those participating in experiments are also involved (Rheinberger, 2006). Participants are active, and can shape the experiment rather than being the controlled element the experiment is measured across. They contribute to, and decide the outcome of, the result, with attention being paid to their thoughts, ideas, and interpretations (Latour, 2004b). Participants are not controlled, and are certainly not repeatable. There are also attempts to open dialogue more effectively around the diffusion of knowledge between 'experts' and lay people (Callon et al., 2009; Callon, 1999), though expanding experiments has increasingly blurred this distinction. As experiments have become more complex and larger in scale, so more people have become, and have the potential to become, involved in them (Latour, 2004b). Individuals' backgrounds and expertise have become less important than in the 'traditional' laboratory setting. This re-configuring of experiments presents multiple questions beyond these three areas, knowledge production, the organisation of space, and who gets to (be involved in) experiment(s). However these are the three this thesis explores further.

In addition to this, geographers have sought to engage with experiments in different ways. Currently, this engagement broadly takes two forms, both often falling under the umbrella term of 'experimental geographies' (e.g. Last, 2012b), and both of which have been addressed in recent literature. The first relates to the *geographies of experiments*, the geographical interest in 'accounts exploring diverse empirical sites of experimentation' (Kullman, 2013: 879). The second relates specifically to experimenting within geography, a process since loosely termed as *experimental geographies*. I now explore each of these in turn, before exploring the artists working at the interface of these.

1.1.1. Introducing experimental geographies

Angela Last identifies two key types of the umbrella-termed 'experimental geographies'. The first is about science and technology experiments, which relate to the *geography of* (science and technology) *experiments*. These science and technology experiments can and have been analysed geographically (see Thrift et

al., 1995), while developments in science and technology create new experiments for geographers to work with.

The *geography of experiments* have spawned from recent moves within Geography to consider a geography of science (Powell, 2007; Withers, 2002b) and a geography of truth (Thrift et al., 1995). These moves have sought to consider the specificities of key practices and sites of scientific knowledge, such as the laboratory (Thrift et al., 1995), observatory, lecture hall (Bourdieu, 1992), and the library (Chartier, 1994), each of which has their own 'distinctive history' (Thrift et al., 1995: 2). For Thrift et al. (1995), these specificities draw on three key geographical aspects: 1) practicality, such as the tools and processes comprising study; 2) relations, such as rejecting the notion of (scientific) objects (of knowledge) as objectified entities; and 3) spatiality, the physical location *where* knowledge is produced. These geographical contributions are salient, while geographers are attempting 'to make distinctive contributions in science studies, perhaps especially in studies of the geographical sciences through investigations of technologies of circulation, movement, and assemblage' (Powell, 2007: 322). Against the historical grounding of experiments within science, so a recognition of a geography of science has led to recent questioning around the *geography of experiments*. For Ronell (2003), this relationship to science 'invites us to read the scene of experimentation, its fractured promises and articulated procedures, the historical renewals, stalls or question marks, which the experimental disposition has generated' (2003: 656).

Kullman (2013) identifies how the *geographies of experiments*' have been previously engaged with in geographical discourse, some of which have included a cultural engagement in performance studies and art (see Ingram, 2012). However, others have focused on the histories of laboratory spaces (see Lemov, 2005; Latour, 1999; 1988), and the changing notion of experimental urban spaces (Evans and Karvonen, 2011; MacFarlane, 2011; Gross, 2009; Hinchliffe et al., 2005). As this breadth shows, many of these tend to focus on geographical engagements with either science and technology on the one hand, or with artistic and cultural practices/engagements on the other. However, to fully explore the *geographies of experiment*, according to Powell and Vaseduvan (2007), requires paying attention to 'the full range of bodies, texts and practices that constitute spaces of

experimentation' (2007: 1790). Once an understanding of these is considered, their geographies can start to be explored, while Powell and Vaseduvan's (2007) identified need to understand bodies, texts, and practices highlights the key opportunities of using Geography and art engagements to consider experiments.

The second key type of the umbrella-termed 'experimental geographies' Last (2012b) identifies concerns artistic experiments and cultural geography, relating to what Kullman (2013) and Paglen (2009b) term '*experimental geographies*'. Artist-cum-geographer Trevor Paglen (2009b), whose work focuses on mass surveillance, data collection, military use of space, and ethics, links Geography and experimentality through geographers' creation – rather than study – of (conceptual or physical) spaces. For him, 'experimental' implies 'production without guarantees' (2009b: n.p.), which the act of producing new space must surely entail. He writes:

> 'Geography […] is not just a method of inquiry, but necessarily entails the production of a space of inquiry. Geographers might study the production of space, but through that study, they're also producing space. Put simply, geographers don't just study geography, they create geographies. […] If human activities are inextricably spatial, then new forms of freedom and democracy can only emerge in dialectical relation to the production of new spaces' (2009b; n.p.).

For Paglen, then, for geographers to study mass surveillance analyses geographically, creates a geographical line of enquiry about mass surveillance, actively creating that space for further discussion and research. Paglen, then, identifies geographers as central to the development and *understanding* of new space(s).

One way geographers have sought to develop and understand new spaces is by engaging with artists. Both Kullman (2013) and Last (2012b) outline existing work in *experimental geographies* involving artistic experiments and cultural geography. Kullman argues many human geographers wish to integrate experimental practices into their work, to reconsider their practices across social and cultural geography. Engaging with experiments offers opportunities to fulfil Geography's wish to go beyond the ''safe', orderly and established' (Last, 2012b: 708), connected with a

desire to move geographical knowledge 'beyond prescribed environments' (ibid) and introduce this geographical knowledge into conversation with disciplines, audiences, and spaces beyond Geography.

There are several vibrant interactions, some of which involve art and artists in *experimental geographies*.[21] One such art engagement is Thomas Jellis' (2014) paper, dedicated to an interview with contemporary artist Olafur Eliasson to explore the geographical importance of Eliasson's ideas. Given such a format was published in a geographical journal shows the increasing disciplinary investment going into engagements between art and Geography, incorporating more artistic practice into geographical research. In addition, Enigbokan and Patchett (2011) also produced an artwork titled *Terrible Karma* to mark the centenary of the Phnom Penh Triangle factory fire. Angela Last produced her *Mutable Matter* (2012a) project as part of her post-doctoral project in Geography, while Hillary Ramsden uses a 'practice-as-research methodology' (Ramsden, 2016: n.p.) to introduce a 'playful' intervention into what she terms a 'habitual cultural practice' (ibid, 2016: n.p.) such as walking. A collaboration between Rebecca Schaaf, Juliann Worrall-Hood, and Owain Jones (2016) sought to extend discussions over art-Geography collaborations into student learning experiences, using Bath Spa University campus as the setting for reflecting on 'the processes, outcomes, and challenges of collaboration' (Schaaf et al., 2016: 319). These represent some of a plethora of artists and geographers involved in each other's disciplines, such as those on a Merle Patchett (2011) blog post, on her blog (https://merlepatchett.wordpress.com).

Other vibrant interactions consider geographers' use of experiments to conceive of space. These include the sensorial representation of space, such as through Gallagher and Prior's (2013) notion of 'sonic geographies' (see also Gallagher, 2015) or Paterson's (2009) 'haptic geographies', both of which re-configure conceptions of space according to the dominant sensory mode of exploration. Other interactions also include the process of practices, such as in the use of 'creative geographic methods' (Hawkins, 2015) or in using text to produce space which experiments can then be performed in (see Paglen, 2009b; also Watson, 2009).

[21] A substantial engagement with art and Geography follows in Chapter Two.

These engagements show how the kinds of calls for more ‘‘creative’ and ‘playful’ encounters with the socio-ecological worlds in which we live’ (Braun, 2015: 103), which Braun states have started to be answered.[22] A significant conversation between artists and geographers has developed, and many of these art-Geography engagements highlight how experimental geographies can spawn and make use of productive encounters between artists and geographers. To gather people around artworks provides the *situation* to force thought on Braun (2015) refers to.

Experimental geographies, then, provides an opportunity to ask geographical questions using an ‘experimental research apparatus’ (Whatmore and Landström, 2011), which, for Braun (2015), offers an opportunity to bring something critique is no longer able to: to bring something ‘genuinely new or novel into the world’ (2015: 105). Instead, such an apparatus expands ‘…the ways in which a situation is able to affect its participants, and in so doing, generate new ideas, new powers, and perhaps new possibilities for composing socio-ecological assemblages otherwise’ (Braun, 2015: 106).

Furthermore, Last (2012b) argues there is an enormous breadth of experimental work. Experimental geographies is expansive and invokes practices, literatures, and concepts implicated by association, including work beyond Geography. Experimental geographies is, after all, experimental and thus does not (yet) have a fixed (set of) definition(s). For Last (2012b),

> ‘…practices of thinking and doing that are embraced under the banner of experimentation do not comprise a unified body of work. [...] ‘Experimental geographies’ also do not merely include work that calls itself experimental, but also the work claimed as ancestor or ally’ (Last, 2012b: 706-7).

This breadth presents challenges but also opportunity, a scope for including different disciplines, understandings, shared practices, and concepts. Such opportunity has been seized on by geographers and non-geographers alike (Last, 2012b) in works already too numerous and expansive for Last (2012b) to note, even back in 2012.

[22] Recent work by Ian Cook and his Ph.D. student, artist Paula Crutchlow on the *Museum of Contemporary Commodities* uses creative and participatory encounters with objects to ask questions of value, culture, and heritage.

Experimental geographies, then, does not have to be performed by geographers, nor have an output present in a Geography-approved output format such as an academic journal. They can take many forms.

This thesis interacts with experimental geographies, and explores the relationship between its two strands – *geographies of experiments* and *experimental geographies*. This thesis, then, seeks to explore how experimental geographies is being utilised in a dynamic engagement between geographers and artists, through the medium of institutions. In engaging with the *geographies of experiments*, the thesis confronts the experiment's conventional housing in institutions, such as laboratories (Thrift et al., 1995) and observatories (Bourdieu, 1992), and provides the contextual frameworks and protocol for experiments. However, the proliferation of experimental geographies has opened up these conversations, including ones around the institutional framework for these experiments. This thesis argues the most potent space to explore these might therefore be through the new kinds of experimental institutions that artists are setting up and working through.

This section has identified recent trends re-configuring the experiment, which present geographical implications. These implications highlight the recent developments in Geography and the social sciences around the 'experimental turn', a move resulting in experimental geographies which this thesis is grounded in. The two main avenues of engagement within experimental geographies so far were discussed, the first concerning the *geographies of experiments* and the second *experimental geographies*. As the chapter and thesis unfold, what becomes clear is the complexity of ideas connecting knowledge-producing institutions, experiments with science and nature, artists, and geographers. Institutions are, as yet, a relatively under-explored tool to bring experiments, artists, and geographers into conversation with each other. This thesis seeks to exploit this, offering a way of engaging experimental institutions and critical artists with Geography. Subsequently the thesis situates the work of key artists and artist-led groups more widely to critically examine institutions. To this end, I now turn to introduce two key artists which this thesis engages with, both of which have made salient and expanding contributions to Geography and are engaging with experiments on the one hand, and science and technology on the other.

1.2. Contextualising and participating: Situating artists involved in geographical debates around science and technology

In this section, I identify two key artists this thesis engages with throughout. They are Neal White and Richard Pell, whom I document respectively after prefacing their work with recent debates in Geography concerning experiments, institutions, and science and technology.

1.2.1. Artists' involvement in debates within Geography

Recently, the *geographies of experiment*s and *experimental geographies* have been a fertile space for geographical conversation. Topics involving experiments have consistently appeared at key geographical conferences, such as the Royal Geographical Society with the Institute of British Geographers (RGS-IBG) and the Association of American Geographers (AAG) annual conferences.

Notably, many of these sessions have also been attended by a particular group of artists becoming increasingly involved in geographical discussions. These include Merle Patchett, Trevor Paglen, Steve Rowell, Neal White, Richard Pell, and Angela Last, amongst others.[23] Conversations have overlapped and formed different configurations at different geographical events, but these names have appeared consistently. Neal White and Richard Pell, in particular, form one part – each independently – of a conversation happening between Geography and experimental artistic practice.

In recent years White and Pell have become increasingly involved in geographical conversations around experiments. White has increasingly invited geographers to contribute to his work[24] but he has also been invited *to contribute* to geographical discussions. Contributions have taken numerous forms and formats across a

[23] This group of names appear the most regularly throughout the thesis because they contribute to particular geographical areas the thesis examines.

[24] White engages with geographers as official and unofficial associates of his Office of Experiments, including Gail Davies, Thomas Jellis, and Sasha Engelmann.

decade. These span from the most recent RGS-IBG international conference in 2016 where I used his work as the basis of my presentation, to his early contributions to the *Locating Technoscience* series of workshops hosted by University College, London (UCL) in 2006-7.[25] White has contributed to chapters in books on political geography (see Williams et al., 2016), has been the focus of a geographical journal article (see Davies, 2010) and commentary (see Last, 2010) published on his *Secrecy and Technology* bus tour, and has contributed to other workshops involving geographers, such as the *Knowledge/Value* workshop.[26] Additionally, he has also become a regular fixture at international Geography conferences, contributing to the AAG Annual Meeting in 2011 and 2012, and the RGS-IBG Annual International Conference in 2015 in a session organised by myself. In this way, he is recognised as potentially offering valuable contributions to these discussions. At these conference events, White has continually produced new insights to key geographical questions and research areas, notably concerning experimentality, ruins, and the Anthropocene in three international conferences. Though an academic,[27] he is not a geographer by trade yet he clearly makes valuable contributions to Geography.

Pell is also involved in recent geographical discussions across different formats. For him they are more of a recent development, and involve discussions of his Center for PostNatural History (CPNH) rather than his previous work at the Institute for Applied Autonomy (IAA).[28] [29] Pell appeared at the AAG annual meeting in 2012 alongside

[25] The *Locating Technoscience* series was designed to stimulate discussion between practitioners of Geography and Science and Technology Studies (STS).

[26] The *Knowledge/Value* workshop series ran from 2011-2014, and spanned five workshops. It was organised by the anthropologist Kaushik Sunder Rajan, and brought together philosophers, geographers, anthropologists, sociologists, artists, and other practitioners to discuss different elements of knowledge and value in an interface between Anthropology and STS. These practitioners included the geographer Gail Davies, and the anthropologists George Marcus and Joe Masco, among others.

[27] White's current academic role reflects his research and practitioner interests, being appointed Professor of Art/Science at the University of Westminster in September 2016.

[28] Pell co-founded the IAA, and was previously involved in this collective for around ten years, before founding the CPNH. The IAA were an activist group who used Tactical Media (which I discuss in Chapter Four) through electronics and robotics to extend the limits of human autonomy to counter-act the forces and structures imposing limits on this autonomy. The IAA critiqued institutions to engage audiences about science and technology, while their mission was '[t]o study the forces and structures which effect self-determination; to create cultural artifacts [sic] which address these forces; and to develop technologies which serve social and human needs' (IAA, 2016: n.p.).

[29] Pell's work at the IAA – though geographically relevant – was not seeking to engage with geographical conversations at the time.

geographers Jamie Lorimer and Gail Davies[30] on a session considering 'Practices for a Post-Natural History' (Last, 2011). The CPNH was also used in Davies' (2014) paper on GloFish®, while a CPNH photo was chosen for Beisel and Boëte's (2013) paper on genetically modified mosquitoes. In addition, I also gave two papers focused on the CPNH at the RGS-IBG 2015 Annual International Conference. The first was an invited paper where I drew on the CPNH's *Atomic Age Rodents* exhibition – a paper which I published extracts from as a commentary in *Society and Space* (Walker, 2015) – while the second critically analysed the CPNH's aesthetic and experimental framing as an institution. All of these help continue the CPNH's role in academic geographical conversations.

However Pell also valuably contributes to Geography beyond its professional academic setting. Notably, Pell's CPNH appeared in *Nature* in February 2012 and the *National Geographic* in March 2015, both with a readership in the millions. Like White's, Pell's work has also contributed to geographical conversations about experimental research practices, fieldwork, and institutions. It contributes to involving both White and Pell in an increasingly audible geographical, overlapping cross-disciplinary conversation.

The geographer Gail Davies has worked with both White and Pell, work which inspired my contribution to their practices in this thesis. Yet she only became aware of Pell's work through White; it transpires White's OOE 2010 project titled *The Redactor* included a contribution from Pell as the project's 'Nature correspondent'. So these connections are not simply linear or even cross-disciplinary, but intra-disciplinary, non-disciplinary, inter-disciplinary, demonstrating a complex and experimental network involving a range of other artists and practices, which are explored in Chapter Four.

Fundamentally, White and Pell both bring their backgrounds to this area, and their past and current work uses institutions as central to their practices. Despite different parts of these backgrounds being engaged with by geographers at different events, geographers have consistently overlooked how they are using institutions as a key

[30] This was reported on Angela Last's (2011) *Mutable Matter* blog (http://mutablematter.wordpress.com/), Last being another practitioner engaging with art and Geography.

component of their work. The majority of geographers have only seen a small part of White and Pell's work, work which has previously been *applied* to a geographic topic. This thesis explores the geography of their work in its own right through exploring their use of institutions, attending to their work previously overlooked or fleetingly engaged with. In doing so, I consider the institution as a medium central to both of their work with key geographical implications, providing new ways of considering institutions, alongside their work, within experimental geographies.

1.2.2. Neal White

In this section, I introduce artist and researcher Neal White's background and explain his inclusion in this thesis. First, I chart his art-based professional history. I then introduce his key research interests, before explaining the manifestation of these interests in the Office of Experiments (OOE), an institution he founded. Finally, I consider his practice both in work as an individual artist and at the OOE, and how it contributes to the thesis.

Neal White is an artist and researcher who uses experiments to critically engage with space, time, technology, and institutions. He describes himself as drawing on 'a recent history of art which has roots in experimental practice, conceptual and socially engaged forms' (NW, 2016: n.p.). His work uses '…experimentation as subject and method to explore the relationship between art, science and radical forms of knowledge production' (Bournemouth University, 2014: n.p.). His background in art and technology manifested in his co-founding of art and creative technology group *Soda*[31] in 1997. *Soda*'s original purpose was to fund each member of the group's personal practices, being united by shared opinions on technology and art. They produced international shows in 'alternative spaces' (NW, 2017) as well as galleries, and enjoyed substantial commercial success particularly during 1997-2001. In this time, they exhibited at global institutions based from Tokyo to New York, and won a

[31] Soda was a collective co-founded by White, Lucy Kimbell, and Fiddian Warman in 1997. They became joined by Julian Saunderson in 1998, and Ed Burton in 1999. *Soda*'s original aim was to 'steer the development and funding of our own areas of practice. Although this practice covers a broad range of individual interests, the group is held together by common views on technology and art' (NW, 2017: n.p.).

BAFTA award for their *Sodaplay* project, a user-driven on-screen digital animation which used biomimicry[32] in its physical movements to mimic arachnids.

Following his departure from Soda in 2002, White sought to explore his interest in criticality and experiments by founding the Office of Experiments (OOE) in 2004. While the OOE was in its embryonic phase, White attended a contemporary art event in Bristol. His ideological positioning and work on science meant he was recommended to meet future long-term mentor John Latham, and Barbara Steveni, founding members of Artist Placement Group (APG). APG was a collective operating in the UK from 1965 to 1989 before re-launching in a different guise – Organisation and Imagination (O + I) – in 1989 to 2009. White became substantially involved in O + I alongside Latham and Steveni, being introduced to board members and attending meetings prior to Latham's death in 2006. White became O + I's Director in 2007, overseeing the group's workings until its board voted for its cessation in 2009. He openly credits the influence of APG and O + I on the OOE, with the OOE's articles and principles reflecting a marked similarity to APG's (OOE, 2016b).

The OOE invokes much of APG and Latham's ideologies, complementing White's research interests whilst allowing experimentality to emerge through engaging with and provoking a criticality of spaces, events, and sources:

> 'Office of Experiments has a commitment to seed the future for an independent collective practice. Our aim is to develop autonomous resources such as archives, databases, publications, and fieldguides, through which we can draw material evidence and interpretive speculation on the fabric of sites, spaces and events. In doing so, we hope to open and create alternative public resources that will inform the broader imaginary, perception, engagement and critical response to the scale, time base, and structures[33] of the rational world' (OOE, 2016c: n.p.).

[32] Biomimicry involves the mimicking of biological movements in structures, materials, and designs (see Johnson, 2016; Johnson and Goldstein, 2015; Goldstein and Johnson, 2014).

[33] By the term 'structures', White refers to the underlying social and cultural structures underpinning contemporary society, such as consumer capitalism and governments, for example.

The OOE provides an institutional framework for experimenting. They have done projects experimenting with site,[34] the social imaginary of institutions,[35] the spaces of the experiment,[36] identifying and exploiting[37] the potential gap between intentionality and perception in experimenting. This gap refers to questions of autonomy – personal, institutional, informational, or experiential – and by extension, power, which the OOE aim to stoke. The OOE have particular loci of interest, specifically around the techno-scientific and military-industrial complexes, but through addressing these they also engage with areas beyond those united by art and activism. OOE commentator Matthew Flintham addresses some of these:

> '…the OOE is as much a critique of the instruments of power and the ways in which they may function as it is a gatherer of information and a producer of art. White states that one of the aims of the OOE is to bring artistic researchers and political activists in from the cold and legitimise their activities within a counter-institutional framework. When an OOE tour bus filled with researchers stops outside Porton Down defence laboratories, its purpose may be part-performative spectacle and part-legitimate research, but it also serves to illustrate how strategies of art and activism are mutating and finding new ways to push at the borders of secrecy and power' (Flintham, 2012: 9-10).

As Flintham suggests, the OOE are not just an art-making institution, but also ask geographically-relevant questions. As an institution, they are tethered to their APG-inspired original articles and principles, questioning the taken-for-granted. The OOE seek to consider the obscured or non-visible as much as the visible, drawing attention to the partiality and hierarchies in existing structures. In asking *how* things are situated as they are, as much as *why* they might be so, the OOE engage with critical questions around secrecy, power, activism, and research. It is this

[34] See the OOE project titled the *Overt Research Project* (*ORP*), which along with *Ott's Sneeze*, *SEC*, and *The Void*, are covered more in Chapter Five.

[35] As demonstrated in *The Void*.

[36] As seen in *The Void*, and in *SEC*.

[37] A notable example of this gap being exploited to conflate ideas of truth is the OOE project *Dark Places* (a component of the *ORP*), which is covered in more detail in Chapter Five. See http://www.hansardgallery.org.uk/event-detail/49-dark-places-office-of-experiments-steve-rowell-beatriz-da-costa-victoria-halford-and-steve-beard/ for an overview.

engagement with the amalgamation of these geographical, research-based, and sociological discourses which sees it have potential for such a fruitful contribution to experimental geographies.

Critical questions around secrecy, power, activism, and research are addressed through experiments conducted by the OOE, addressing key geographical interests in projects with unknown outcomes. Put another way, they address key geographical interests through *experimental geographies*. Often these experiments additionally ask questions of the *geographies of experiments*, such as the space(s) in which structures come to be, as well as in experimentation. The OOE also consider present-day structures' political, social, cultural, and institutional context, and the relationship of actors with these spaces of experimentation by exploring notions of power across different scales, mediums, and people involved in creating these structures. Through these experimental means, the OOE becomes a key institution for engaging with the *geographies of experiments* and *experimental geographies*.

In founding the OOE, White produced a cleavage in his work. Now he had an institution which sought collaboration for projects corresponding to the OOE's research interests. At the OOE, he collaborates with practitioners for projects, drawing on required expertise for each project. Projects are based around the OOE's articles and principles, and typically explicitly link to social practice, a form of art where visitors are participants, constituting the artwork.[38] The OOE has two other key practitioners involved in its set up: artist and researcher Steve Rowell, the OOE's Independent Research Director; and artistic researcher Lisa Haskell, the OOE's Technical Director. It also has associates – both official and unofficial – which it engages with, and utilises for project briefs.

However, White still produces works under his own name, providing freedom from the OOE's articles and principles to undertake any project area of interest. Under his own name, White still engages with other practitioners, but often for different expertise such as their roles in securing funding or exhibition space. Given some funding opportunities are only available to individual practitioners, and others to

[38] Social practice, derived from Beuys' 'social sculpture' (Jordan, 2017) is explored further in Chapter Two.

institutions, having both guises allows him complete flexibility to respond to opportunity as and when it appears. For this thesis, having both guises enables an opportunity to explore the role of the institution in his practice, which I pick up again in Chapter Five.

White's experimenting with key ideas, people, and institutions revels in art's 'expanded field' (Hawkins, 2013; Krauss, 1979), a notion detailed in Chapter Two. His experiments typically concern time, materiality, institutions – often science – and technology, and different configurations of these, and often use people through social practice as the means to experiment. In using social practice, White uses people as the vehicles to engage with complex questions, implicating the social imaginary around concepts which, for White, are socially constructed and exist *in* the social imaginary. He seeks to create tensions between particular materials or ideas, often jarring them against each other to question the common system linking them. In Chapter Five, I use examples of four key projects of White's in further detail to analyse his practice.

1.2.3. Richard Pell

In this section, I introduce artist-trained researcher[39] Richard Pell, and demonstrate his importance for this thesis. I commence by outlining the progression of his research interests to understand his current practice. His research interests manifest in his current work, the Center for PostNatural History (CPNH), which I then explain the aims of before demonstrating the CPNH's contribution to experimental geographies.

Richard Pell is a researcher trained in art, based in Pittsburgh, USA. He works at the intersection of science, engineering, nature, and culture. Despite having a background in art and being a Professor in Art at Carnegie Mellon University, Pell's interests have been wide-ranging, including robotics, programming, and engineering. He, like White, seeks to use his role as an artist to engage with the emerging notion

[39] By this term, I mean that Pell is a researcher though his formal training was in the arts.

of artistic practice as a form of research[40] (McNiff, 2013; Mareis et al., 2011), which I explain more in Chapter Two.

A student of Carnegie Mellon University (CMU),[41] Pell originally intended to study computer science, an interest which he kept despite eventually enrolling on an art degree. On his course, Pell was taught by Steve Kurtz – co-founder of Critical Art Ensemble (CAE), at the time on faculty of the art department – who became a significant influence for Pell. Channelling his interest in hacking using technology combined with Kurtz's expertise on the forefront of the newly-emerging Tactical Media (TM),[42] Pell co-founded the Institute for Applied Autonomy (IAA) in 1998. Kurtz aided in establishing IAA, co-writing the IAA's foundational *Contestational Robotics* manifesto with Pell, a manifesto seeking to combine the theory and practical construction of using robots for political resistance. Following *Contestational Robotics*, the IAA sought to involve technology, social and cultural organisation, and media into their projects, imbuing several tactics and strategies propagated by CAE.

Predominantly active during the late 1990s and early 2000s, the IAA produced several notable activist projects. Members were mobile, both geographically and socially, with IAA members frequently appearing in projects by other activist groups such as the *Yes Men*.[43] However as the IAA started dispersing and members left for differing reasons, Pell took many of his experiences and invested in his interests in four key areas: science, hacking (previously expressed through computer science), nature, and culture.

[40] Artistic practice as research advocates using artistic practice as method in enquiry, rather than borrowing research methodologies from other disciplines to investigate artistic practice. In a similar way one uses social science methods for a social science investigation, so McNiff's (2013) argument goes, using artistic practice as a method helps explore the empirical, conceptual, and epistemological contributions artistic practice can make.

[41] CMU is a Pittsburgh-based university renowned for its robotics and technology focus.

[42] TM is an activist strategy in using influential media for mobilising people.

[43] The *Yes Men* are an activist group, primarily fronted by Jacques Servin and Igor Vamos, whose projects have spanned media interviews, films, and social experiments to raise awareness of social and politically-charged issues.

He won several grants[44] to establish what would become the CPNH, a physical space dedicated to *highlighting* humankind's influence on the living world in contrast to being downplayed at natural history museums. The CPNH's focus is the 'postnatural'[45] as manifest in postnatural *history*, whose definition is twofold. Primarily it is, 'the study of the origins, habitats, and evolution of organisms that have been *intentionally* and *heritably* altered by humans' (CPNH, 2016: n.p.), and secondarily 'the record of the influence of human culture on evolution' (ibid).

The Center studies postnatural *artefacts*; essentially, anything intentionally changed by people, for a purpose that has permanently influenced a species' genetic trajectory. This encompasses much of humankind's contemporary everyday environment, and loosely falls into three main categories of breeding[46] by humans of living things:

1) Domestication – the taming of 'wild' species, such as horses, chickens, and bananas;

2) Selective breeding – the refined breeding of organisms possessing particular desirable genetic traits, creating, for example, varieties of dogs, cows, and corn;

3) Genetic engineering – the manipulation or splicing and insertion of genes, such as in GloFish® (Davies, 2014).

These three methods resulting in intentionally and heritably altering an organism's genetic trajectory would be, for Pell, 'postnatural', providing it is done by humans on purpose:

"If you clip your bushes in the shape of Mickey Mouse that's not really postnatural, but if you can trick them into breeding so they make little tiny Mickey Mouse plants then that might be […] especially if you're doing it on

[44] Including a Smithsonian Artist Research Fellowship. Full list available here: http://postnatural.org/About.

[45] The 'postnatural', is a term which, although being used previously, has been re-coined by Pell to refer to the intentional and heritable alteration of organisms by humans.

[46] Other cases have been made a fourth category of breeding termed 'induced mutation' whereby a mutation is encouraged to reproduce, however I argue this is part of the selective breeding process.

> purpose. It doesn't count if it's insects that are mutated as a result of the Fukushima disaster which is clearly a culturally-created ecological disaster, but I would argue is not on purpose" (Pell, interview in Makers of the Waag Society, 2012).

Intentionality is crucial, showing a purposeful decision taken by consecutive people to direct the genetic lineage towards a particular goal. There is no chance involved; it is all calculated, considered, and executed. Essentially, it is 'sculpting the evolutionary process' (Pell, 2014: n.p.), which, for Pell, shows the effects of humanity's decisions. Critically, these are the results of decisions consciously made, and therefore every person has the power to make decisions to *stop* this behaviour. Every person is involved in it and can act to stop it, and it is this active role each and every person has which Pell highlights through using social practice. The CPNH is self-guided, allowing the participant to choose which exhibits to experience and in what order. This, like the IAA, returns personal autonomy to the participant. They can choose their order, just like they can choose their decisions which impact the living world.

Through these decisions, humans have, for Pell, created a world where every known species exists solely because it fulfils a specific purpose or cultural desire with any outliers being bred out. The contemporary world exists from experimenting through millennia, across ever-increasing scales in a globalised world. This cultural heritage, Pell argues, involves decisions which are continually made and re-made, so the CPNH seeks to read it as an insight into contemporary culture:

> "One of the important parts of that is the intentionality. That this is the stuff we did on purpose and therefore we can interpret it as a cultural work, the same way we look at architecture and try to learn something about a civilisation based on that" (Pell, presentation in PIP, 2013).

For Pell, this is humankind hacking nature; experimenting with nature's rules to produce things solely for cultural desire or benefit to humankind. His work also reflects on the scientific method, using time-dependent scientific understandings to make such drastic alterations to species genetics, and make them heritable.

Pell's CPNH represents a way to present 'new or novel' (Braun, 2015) approaches to thinking about humankind's relationship with the world by implementing a 'ready-to-be-surprised disposition through which we might be struck by the extraordinary found in the ordinary' (Braun, 2015: 106; see also Woodyer and Geoghegan, 2013; Haraway, 2007;[47] Bennett, 2001).[48] They use specimens and displays to stimulate this disposition, combining artistic practices of taxidermy, aesthetics of similar institutions such as natural history museums, and an artistic practice as research method to raise geographical questions around both the *geographies of experiment* and *experimental geographies*.

The CPNH brings a different conception of an institution to White's, being a physical entity at a fixed location in Pittsburgh. It considers questions around the *geographies of experiments* through charting a history of experimentation whose effects live on in the current, physical matter of the living world. It questions the global scale of experiments, and positions every human as involved in experiments of this global scale (see Sacks, 2007).[49] But it also asks where experiments happen (see Lorimer and Driessen, 2014).[50] Do they happen on-site at the CPNH? In the questions with Pell about the specimens? At home, when the participants have gone home and done their own research? When the participants have told their friends about this new interest of theirs? Is it even in the minds of the participants, rather than a physical space? On a much larger scale, the CPNH showcases the perpetual experiment of humankind, to continually alter its surroundings to meet its ever-changing desires. It is a continual experiment and its outcomes continually uncertain.[51]

The CPNH provides an institutional gateway into such complex experiments, providing details of their exhibits' past experiments and their individual stories. But

[47] For Haraway (2007), this is more concerned with 'play' as derived from a re-arrangement of elements which can present new openings (see Braun, 2015).

[48] Bennett's (2001) work on 'enchantment' and its role at the CPNH is covered in further detail in Chapter Six.

[49] Sacks (2007) highlights the global scale of participants in experiments through her *Exchange Values* project, discussed in more detail in Chapter Two.

[50] In Lorimer and Driessen's (2014) paper, they discuss the fluidity of spaces of experiments, which highlights the fluidity of deciding where and how to measure a space of experiment.

[51] This relates to Paglen's (2009b) understanding of 'Experimental Geography', involving 'production without guarantees' (2009b: n.p.).

the CPNH also runs its own experiments which involve their visitors as participants. These participants are the experiment's medium. However, they are also the contributors to and participants in countless previous global experiments about how humankind alters its environment through lifestyle and purchasing choices. The CPNH highlights participants' role – as consumers, and as being preceded by their experimental predecessors – in previous experiments, the results of which are displayed in the animal and plant specimens on-site before their eyes. These specimens are experimental in a concrete way, literally being the result of experiments developed and refined over thousands of years through processes like domestication and selective breeding.

The CPNH can also be seen as an example of *experimental geographies* in its method of asking questions through experimental processes, which are related to geographical topics. Though the CPNH's other engagements with experiments and institutions are covered in Chapter Six, there are three main ways the CPNH exemplifies *experimental geographies*: through questioning the role of firstly institutions in experiments, secondly institutional personnel, and thirdly experimental protocol in institutions.

Firstly, then, the CPNH experiments with institutional spaces. It is experimenting with what a museum can do, moving away from the traditional natural history museum whose formula for display and engagement has been refined and repeated over centuries. Do museums educate? Do they inspire? Do they provoke wonder? Do they cultivate curiosity? At the CPNH, the onus is on the participant to ask the questions, rather than the institution to provide easily digestible information framing the objects. The hope is for participants to leave with many questions which they seek to answer in their own time, under their own motivation. Pell summarises the purpose of this CPNH-inspired intrigue:

> "That's the trick in museums and places – if we want to be cultivating curiosity – is how to get people to arrive at their own questions that are really their own. And not to answer them, but let them leave with them. And in that moment you are actually starting to teach yourself. […] [T]hen you can learn something that you won't forget because you wanted to

know it to begin with, which is the hard part in teaching" (Pell, interview in Pitt ULS, 2016a).

So like White at the OOE, the CPNH is also employing social practice. But, also like White and the OOE, the CPNH do not know the outcome or what knowledge may be produced; producing without guarantees (see Paglen, 2009b), experimenting.

Secondly, the CPNH experiment with institutional personnel, asking who is in an institution and who isn't, beyond in the literal space. If someone is unaware of how their decisions impact the living world, are they part of institutions involved in creating postnatural species? If so, how? And how might they 'leave' these institutions?

Thirdly, the CPNH experiment with experimental protocol around how experiments happen. Where do experiments happen? What materials are used? And who is performing these experiments? Is it Pell, through collecting and exhibiting these specimens or inviting conversation around them? Is it the scientists who produced the genetically modified species in Pell's collection? Is it every single human, who participated in the production of a society which – as a whole – produced these so radically different specimens? Or is it a CPNH visitor, given they decide the outcome of this project?

For Pell, though he has formerly had his own individual practice, his practice is now intimately tied up with the CPNH. His practice *is* the CPNH, and it provides a tool for him continue his practice. However the CPNH, though almost entirely run by him, is not *completely* run *solely* by him, which makes distinguishing exactly what is his contribution and what is others', tricky. The CPNH's other key contributor[52] is Pell's wife, Lauren Allen, who is the CPNH's Director of Science and Learning.[53] As such, his personal practice has therefore become amalgamated into a shared one, run through an institution.

[52] I use the term 'contributor' because the CPNH as a venture was originally conceived of as a solo project by Pell, before he enlisted Allen's help. She contributes her expertise to further the CPNH's goals but these goals themselves are based predominantly around Pell's vision and practice.

[53] While Allen is the main other contributor, she is by no means the only one. Pell is quick to highlight the contribution others have made to the CPNH, providing a full list under the title of 'Essential Personnel' on their website, available here: http://www.postnatural.org/About.

Accordingly, both White's and Pell's work can be understood as seeking to augment Stengers' (1997) understanding of an 'intelligent experiment'. Stengers outlines an 'intelligent experiment' as an experiment relying on the assumed need to ask relevant questions, which the experiment is set up to answer. For Stengers, deciding who gets responsibility to decide on and ask these relevant questions is 'risky', enabling the asker to direct the experiment. Both White and Pell give this responsibility to their participants through social practice. Here, the participant identifies what *they* perceive and experience as important. The artist provides the experiment's tools, expressed through particular objects, displays, or other media, and ultimately the *participant* decides what the relevant questions are through their experience. This shifts the 'risky' responsibility Stengers (1997) refers to, of determining the relevant questions, from the experiment's deviser to the people it is being conducted on. They do not just determine the relevant questions, but by extension the experiment and its outcome.

Both White and Pell draw on successive conceptual movements in the art world through the mid-late 20th Century, notably drawing from institutional critique and social practice as deriving from Joseph Beuys' 'social sculpture'.[54] Picking up the role of institutions, both White and Pell frame their work through an engagement with institutions, across two contrasting scales. At one end, individuals are engaged with through social practice (Nabulime and McEwan, 2010; Cook et al, 2000), acknowledging their role in constituting institutions (see Foucault, 1980a). At the other end, White and Pell implicate *global* institutions comprising billions of people, so ingrained in culture and broader society (Foucault, 1980a; see also Mills, 2003) they can be resistant to change,[55] such as the institutions of science and capitalism. Part of White's and Pell's efforts are simply to highlight the institutions operating, and their breadth and ubiquity throughout all layers of society (Foucault, 1980a).

[54] Both institutional critique and social practice in Beuys' context are explored in more detail in Chapter Two.

[55] Foucault (1977) explains how large institutions can use their power to oppress, leading to different forms of resistance (see Foucault, 1988 for how these different resistance forms result from complex and multiple power relations) in an effort to overthrow this oppression.

Institutions are social, and yet so often people are passively complicit in multiple institutions because of a lack of awareness or impetus for change.[56] White and Pell seek to alter these by making people aware of firstly particular institutions, and secondly their inner workings. Participants can then evaluate their opinions, providing opportunity for change based on knowledge, ensuring participants can instead comprise institutions they know of and are happy with. White and Pell seek to remind participants that institutions' social comprisal produces a mutability. Institutions can be changed.

White's and Pell's work seeks to engage with particular institutions, chiefly those implicated in science and technology, sometimes aiming to enter into conversation with these institutions, sometimes to utilise their standing to tap into potentially interested participants, or sometimes to attempt change from the inside. But engaging with institutions remains only part of the story.

White and Pell also seek to critique institutions where appropriate, such as those institutions operating in science and technology. Both White and Pell do this by creating their own institutions, which is a threefold provocation. Firstly, creating an institution allows them to outline flaws they perceive in the current procedures and protocols of existing institutions. Secondly, White and Pell seek to demonstrate the problems[57] with these existing institutions by exemplifying – and potentially taking the place of – them.[58] Exemplifying these institutions encourages thought about them but in a context not normalised like these institutions might be, highlighting them and justifying a space for their own institutions. Thirdly, setting up their own institutions allows White and Pell to imbue particular institutional values to use their own methods, protocols, and procedures back onto that institution. One example might be adopting a strategy a current institution uses and then using it *on* them to show its implications. Creating new institutions offers alternatives to current institutions which

[56] Though Foucault (1988) outlines how power relations are complex and multiple, meaning the reasons for such complicity are rarely so simple, nor rest entirely with the individual.

[57] One such problem might be with science. For example, in the context of the CPNH, celebrating a scientific advancement without any regard for how this might be used, or its implication on the living world, would be problematic.

[58] One hope might be that in exemplifying existing institutions, participants become so disillusioned with the highlighted existing institution, and move to support White's or Pell's new institutions *instead* of its predecessor.

can help re-frame how participants conceive of and engage with existing institutions, as well as considering the subject matter shown in White's and Pell's created institutions.

1.3. Thesis outline

This first chapter has outlined the conceptual areas the thesis draws on, and explained why these are important to geographers, asked who has been engaging with them, and outlined existing contributions in experimental geographies. It has sought to show where this thesis will complement existing literature and add to recent debates on experimental geographies involving engagements between artists and geographers. Having introduced the conceptual areas the thesis contributes to, I outline the chapter-by-chapter thesis structure and discuss the accompanying research aim and questions according to the chapters they relate to.

In this thesis, I recognise the overlap between experimental geographies and non-representational theory (NRT), particularly so far as NRT's creative inclination to be experimental. Indeed, many of the literatures involving experiments and artistic practice – many of which are introduced in Chapter 2 – derive ideas from NRT. It is, for Lorimer, a 'diverse work that seeks to better cope with our self-evidently more-than-human, more-than-textual, multisensual worlds' (Lorimer, 2005: 83). It therefore makes a salient contribution to key ideas which this thesis draws upon. However, such is the development of NRT as a conceptual area over the last 20 years, NRT also necessarily entails particular ways of conceptualising the practices of the everyday (Thrift, 1997). NRT has its own approach to conceptualising issues and interactions. Rather than approach the complex and multi-layered intricacies of key creative practitioners, practices and ideas using an established framework such as NRT with its established ways of conceiving of and encountering interactions not limited to the representational, this thesis instead seeks to draw on a new combination of literatures, ideas and practices to allow for new ways of thinking to emerge. To draw from NRT directly frames the thesis content in a way which shackles its possible interpretations, and the interpretations of the artists' works

engaged with in this thesis. For this reason, I do not engage directly with NRT in this thesis.

To this end, this thesis contributes to debates on the *geographies of experiments* and *experimental geographies* in current geographical discourse. Much of this conversation involves practitioners from outside Geography, such as Neal White and Richard Pell, but up to this point has tended to explore these areas by either sidestepping, or lacking engagement with institutions.

In this thesis, I contribute to recent work on experimental geographies by looking at the interface of experiments and Geography. Broadly speaking, this is where experiments and Geography meet. This interface takes the form of the *geographies of experiments*, which relates to the geographical aspects of experiments, and *experimental geographies*, i.e. experimental engagements with Geography. This thesis' original contribution to knowledge is to add to this work by engaging with art to explore the as-yet under-explored area involving artist-led institutions. By exploring this interface, I draw on institutional critique from the art world which has moved towards parallel institutions (Last, 2016a; 2016b; 2015) and instituent practices (Raunig, 2009),[59] presenting new ways to engage with experiments. These new artist-led institutions integrate artistic practice as research into their institutions, bringing new modes of thinking, new engagements with social practice, and opening up new possibilities for considering the ever-increasing complexity of experiments across different scales, locations, and institutions.

To explore this interface, the thesis is constructed around a central research aim, which is:

> **Research aim: To explore the emergence of artist-led institutions as new spaces for engaging contemporary issues in science and technology**

This aim is approached by considering key research questions corresponding to different elements, which relate to Chapters Four, Five, and Six respectively. Accordingly, I come on to these shortly. To explore the rationale I have outlined in

[59] Raunig's 'instituent practices' are explained in more detail next chapter.

this chapter, this thesis' research aim and questions seek to open empirical and conceptual areas using examples of how experimental artist-led groups and artists – some of which have formed institutions and others not – have sought to engage with different aspects of science and technology. This research aim and its questions therefore provide a conceptual framework to streamline my engagement with experimental artist-led groups and artists.

Chapter Two situates the thesis among the relevant literature. It outlines the key concepts the thesis engages with and builds on, organising them into two main sections: previous Geography and art engagements around practice, and how locations are used in Geography and art engagements. After introducing the chapter, I explain how the cultural turn in human geography laid the foundations for the current creative (re)turn, a wave of conceptual contribution in Geography integrating artistic practice into geographical research. Having explained the key features of this (re)turn, I explore materiality's role in acting as tools of engagement for artwork visitors and participants by creative practitioners. I address the materials used along with how notions of materiality have been encountered by geographers in these engagements. I then follow this up by discussing aesthetics, notably art's relationship with the 'distribution of the sensible' (Rancière, 2004; in Sayers, 2005). Discussing aesthetics shows how tools for artistic practices are contingent on *perceptions* of artworks (constructed using materials identified in the previous section), practices, and visitor or participant interpretation. I outline a relationship between art, aesthetics, and politics which influences visitor interpretation, and discuss the implications of art altering the 'distribution of the sensible', which concludes the first main section.

The second main section discusses using locations in engagements between Geography and art. This firstly covers an expanded social practice, exploring how the location of artistic practice changes when visitors become participants and become the location of the artwork. Secondly, I discuss the implications of this locational change in artworks' on the institutional critique movement which questioned the spaces, locations, and framing of art, drawing on successive waves of institutional critique in the art world in the mid-late 20th Century. I consider how

institutions have been engaged with by both Geography and art, and the ensuing change in locating artworks, away from places to people.

Chapter Three examines the methodology underpinning the thesis. It commences by introducing previous approaches to integrating artistic practice with geographical research. I then discuss this thesis' approach which draws parallels with a 'multi-sited ethnography' (Marcus, 1995) partly in visiting different study sites to explore different artists' practices engaging with institutions. I show how my ethnography allowed me to trace this artist-led group network by following connections between people, ideas, and institutions, before discussing the literature surrounding key ethnographic methods common between each research site. I then explain the methods used in researching firstly the network of artist-led groups, followed by Neal White's and Richard Pell's practices respectively. Finally I discuss how this data was analysed, along with a section discussing my positionality, before concluding the chapter.

In Chapter Four, I engage with my first research question. This question relates to the first part of my research aim, the emergence of artist-led institutions, and is as follows:

> **Research Question 1 (RQ1): How have artist-led groups experimented with different modes of institutions to publicly engage with contemporary science and technology issues?**

RQ1's first part seeks to take the wider conversations of artist-led groups, of which White and Pell are a part, and discuss how these conversations have led to experimenting with different modes of institutions. RQ1's second part then considers how these groups seek to use this experimenting as a way to publicly engage with science and technology issues which their practices have focused on.

Chapter Four, then, is the first of three empirical chapters. It outlines the development and sharing of practices around institutional practices in art from the 1960s to the present, across the UK and USA. It does this by mapping out the key artist-led groups who are experimenting with institutions to engage with science and technology. These comprise five groups: Artist Placement Group (APG) (later

Organisation and Imagination (O+I)), Arts Catalyst (AC), Critical Art Ensemble (CAE), the Museum of Jurassic Technology (MJT), and the Center for Land Use Interpretation (CLUI). It focuses on the groups' relationship to institutions, enabling them to engage with science and technology. The first section outlines how these groups can work inside and reach out to institutions and draws on APG to show different approaches to working inside institutions, and Arts Catalyst to consolidate art's post-APG role in society and reach out to artists and institutions. The second section examines critiquing institutions, drawing on CAE's use of Tactical Media (TM) as a way to do this. I then examine a case of US national-level institutional push-back during the 2000s involving CAE's co-founder, Steve Kurtz, to demonstrate how critiquing institutions, particularly large and powerful ones, can lead the institution to aggressively push-back. The third section then takes MJT and CLUI as examples of institutions created on their own terms as alternative 'parallel' institutions (Last, 2016a; 2016b; 2015; see also White, 2014).

Chapter Five picks up the second research question, which examines the case study of British artist and researcher Neal White. It considers:

> **Research Question 2 (RQ2): How does Neal White, and his artist-led parallel institution, the Office of Experiments, use artistic experiments to critique social and spatial aspects of science and technology?**

In RQ2, I use Neal White's work, which speaks to the groups explored in RQ1, as a case study of an artist-led parallel institution. It considers how his Office of Experiments (OOE) use specifically artist experiments in their projects to critique what White perceives as shortcomings in the social and spatial aspects of science and technology. Using artistic experiments represents one way of critiquing these aspects of science and technology, which taps into White's wider interest in how science and technology have historically and recently been perceived in the public realm and institutional spaces.

Accordingly, Chapter Five examines Neal White's practice more closely at his OOE, a parallel institution. I show how his practice was influenced by personnel and ideas from key groups in the network outlined in Chapter Four, such as APG, Arts Catalyst, CAE and CLUI. This chapter uses five of his projects, identified and explained in the

chapter, to focus on two key aspects of science and technology White engages with: the social and the spatial. To explore this, I highlight how he uses sites to experiment with how the history of science exists in the social imaginary. I use a recent exhibition of White's to engage with four OOE projects, each of which uses a different relationship to site, and draws on social practice to elicit critique of different aspects of science and technology.

In Chapter Six, the third and final empirical chapter, I explore the third research question. This seeks to discuss the work of American artist and researcher Richard Pell. It explores Pell's work, which also speaks to the groups explored in RQ1, as a second case study to consider a different facet of science and technology, notably how it is publicly discussed. The question is:

> **Research Question 3 (RQ3): Through what means does Richard Pell use his artist-led parallel institution, the Center for PostNatural History, to experiment with public understanding around science and technology?**

RQ3, then, is also split into two parts. The first part takes Pell's work at his CPNH and seeks to explore what the CPNH as an artist-led parallel institution does and what media it employs. The second part then looks specifically at how Pell *uses* the CPNH as a way to experiment with public understanding[60] around science and technology; *examining* the media the CPNH uses and how it contributes to discussions, and its relationship with the public regarding science and technology.

Chapter Six explores Richard Pell's practice at his CPNH, which, like the OOE, is a parallel institution. The chapter examines the CPNH, a physical institution, and considers key influences on his practice, predominantly from CAE, MJT, and CLUI, all outlined in Chapter Four It explores how Pell uses the CPNH as a platform to experiment with public understanding around science and technology by focusing on

[60] By the term 'public understanding around science and technology' I refer not to the body of work in Science and Technology Studies (STS) involved in the public understanding and dissemination of science and technology knowledge to the public. Though there is undoubtedly some overlap, in this thesis I refer to public understanding around science and technology as a way of bringing science and technology into the public realm through everyday experiences, rather than specific steps taken by science and technology to make their work more accessible to the public.

the postnatural, something derived from changing scientific and technological processes through time. I use the CPNH as a tool to explore five key tools they use to experiment with particular modes of understanding. These tools relate to framing the space, designing the space's layout, engaging with participants, curating exhibits, and the enchanting potential of specimens. These help show the CPNH's role in prompting visitors' questions and cultivating curiosity to further understand the implications of scientific and technological processes, such as those on the living world.

Chapter Seven provides thesis conclusions, divided into sections which serve two functions. The first is to pull together key ideas and lines of enquiry into concise, final arguments, and the second is to position these towards the direction of future research. I return to the thesis aim and research questions, summarising each chapter's contribution. These help show the progression of the thesis' argument, which is that artist-led institutions, through the example of engaging with contemporary issues in science and technology, can help engage with contemporary issues in Geography. It shows how art's expansion of the 'distribution of the sensible' (Rancière, 2004; in Sayers, 2005), shown through an engagement with experiments, has implications for three key aspects of knowledge production. Firstly, the physical and conceptual sites of experimentation and knowledge production; secondly expertise and authority, by questioning institutions; and thirdly through asking through what means do experiments happen and knowledge get produced. Through these avenues, it shows how the thesis uses artistic practice and experimental geographies to produce new forms of knowledge production. I then comment on the empirical, conceptual, and methodological contributions the thesis makes, and make suggestions of three potential future research avenues. I finish by asking what might happen in the future for artist-led institutions, and then some final remarks to conclude the thesis.

2.0. Practices, processes, and people: Current institutional engagements in art and Geography

2.1 Introduction

This chapter examines the key literature for the thesis. Having outlined the thesis' contribution to experimental geographies and the epistemological change of experiments in the social sciences in the previous chapter, this chapter uses this backdrop to explore how Geography and art have engaged with one another. I pick up the relationship between experimental geographies and the 'creative (re)turn' (DeLyser and Hawkins, 2014; Marston and De Leeuw, 2013) outlined last chapter, briefly charting how engagements between Geography and art have led to the so-termed 'creative (re)turn' (DeLyser and Hawkins, 2014; Marston and De Leeuw, 2013), providing background to how artists and geographers have experimentally engaged with one another. In light of the experimental turn, geographers have drawn on movements in the art world relating to key themes this thesis engages with around institutions. I identify these as involving artistic practices and locations. These key movements in the art world relate to the re-situating of art 'beyond studio and gallery space' (Hawkins, 2013: 53), a progressive expansion of artistic spaces beyond its traditional confines.

Relating to institutions, in this chapter I ask what are the practices underlining forms of knowledge and what relationship do these have to institutions? Some of these relate to artistic practices as forms of knowing, and manifest conceptually, physically, and socially. I therefore draw on the creative (re)turn in human geography, materiality and aesthetics as examples of the manifestation of the conceptual, physical and social ways[61] respectively of embedding artistic practices as forms of knowing. Following the experimental turn, these differing forms of knowing have become increasingly important to force new forms of thought around complex situations. Recognising and experimenting with these different forms of knowing asks difficult questions of existing institutions, requiring them to adapt to ensure they remain part of the solution to these complex challenges rather than just part of the

[61] The link between the social and aesthetics, although discussed by others such as Kant, I highlight by using Rancière's work later in this chapter.

frameworks which created the challenges in the first place. I therefore identify two key aspects of institutions which are key to this adaptation, and which White and Pell are experimenting with. These are the sociality and spaces of institutions. To explore the sociality and spaces of institutions, the chapter engages with two key movements in the art world, which I argue first relate to social practice and second to institutional critique, before tracing how these movements led to changes being enacted in experiments with institutions.

The chapter, then, is split into two main sections to group these themes together. The first explores engagements between Geography and art based around practices. It considers changes in Geography's encounter with art through the recent 'creative (re)turn' (see DeLyser and Hawkins, 2014; Marston and De Leeuw, 2013), using this to consider geographical engagements with creative practices, materiality, and aesthetics, three areas these engagements have notably manifested in. The second examines how geographers and artists have used locations, and relates to artists' move into the 'expanded field' of artistic practice (Krauss, 1979).[62] I cover two different engagements with locations: 1) an expanded social practice, which refers to using audiences as the sites of artworks; and 2) four waves of institutional critique, which critiques institutions both conceptually and physically. In the chapter's conclusion, I explain how I build on the literatures and conceptual areas outlined in Chapter One and this chapter to lead into the next chapter on the thesis' methodology.

2.2. Geography and art practices

Starting in the 1980s and blossoming through the 1990s, the cultural turn in Human Geography led to numerous studies of the role of art, literature, and performance[63] in the shaping and mediating of places, landscapes and identities (Jackson 2011; 1989; Morris, 2011; Rugg, 2010; Wylie, 2005; Kwon, 1997; Daniels, 1993; Rose, 1993). Since this blossoming period, questions have been asked about where cultural geography sits currently (Waquant, 2016; Crang, 2010). For Bartolini et al.

[62] I discuss this in further detail shortly.

[63] Good examples of these studies include Berger (2008) and Hawkins (2013).

(2016), where cultural geography sits is contentious, even mysterious, epitomised by the title of their paper: 'Provocations of the present: what culture for what geography?' (2016: 745). Fears have surfaced around Cultural geography's role in critical academia (Palsson et al., 2013; Slaughter, 2012) and a 'culturecide' threatening a risk of cultural diversity erasure in the discipline (Tolia-Kelly, 2016).

Following these questions of identity for cultural geography alongside concerns of its future direction (Waquant, 2016), geographers have sought to engage with artistic practice (Schaaf et al., 2017; Engelmann, 2016a; 2016b; 2015; Hawkins, 2015; 2010a; Jellis, 2015) to open up new cross- and inter-disciplinary conversations with creative practitioners, and use creative approaches and styles in geographical research. In creating these cross- and inter-disciplinary conversations, geographers have created an opportunity for re-configuring art and artworks, possibly reaching new audiences for both geographers and creative practitioners. This subsequent attention around these creative opportunities has led to a new 'turn' in Human Geography, dubbed the 'creative (re)turn' (Williams, 2016; Hawkins, 2015; 2013; DeLyser and Hawkins, 2014; Madge, 2014; Marston and De Leeuw, 2013) in light of its cultural turn lineage.

2.2.1. The recent creative (re)turn

To commence this section, I discuss the so-termed the creative (re)turn in geography. The creative (re)turn in Human Geography focuses on incorporating artistic practices and techniques into the geographical research process (Banfield, 2015; Mann, 2015; Patchett, 2014; Yusoff, 2007). It advocates shifting emphasis from output to process (Hawkins, 2015; Dwyer and Davies, 2009; Patchett and Foster, 2008; Parr, 2007), picking up a wave of installation artworks during the late 1970s and 1980s which placed context as central to meaning-making (Weyergraf-Serra and Buskirk, 1991; Krauss, 1979). Installation art was site-specific, arguing that different meanings in different places meant each artwork's meaning was unique to its site. Highlighting process helped show what created relations and meanings at each site, underpinning this movement. Geographers, then, are now increasingly

using not just the outputs of artworks, but are engaging with the creative process of the artwork's production.

This trend of output to process is emerging in some geographical literature (Hawkins, 2013), accompanied by changing perceptions of artistic practitioners and providers as cultural service providers (Kester, 2004) which offer a useful insight into creative practices of culture for geographers to engage with. Subsequently, engagements with aesthetics and aesthetic practices in geographical research have also changed. Approaches for studying output-based artworks are replaced by geographers using artistic practices as a tool to conduct geographical research *with* rather than just *on* (Crang, 2003a). These changes in approaches to artists and artworks are reflected in geographical literature; the journal *cultural geographies*, for example, includes artistic and experimental engagements, while their dedicated extension, *cultural geographies in practice*, focuses on artistic practice used as a form of geographical research.

The creative (re)turn has tended to take two main directions, either engaging with artistic practices performed by artists (Scalway, 2006), or geographers involving themselves in the creative process (Hawkins, 2015; Cresswell, 2014; see also Madge, 2014). In both of these engagements, artworks draw on materials, ideas, and practitioners to produce works away from the traditional artistic framing of the white-walled gallery quiet space (Hawkins, 2013). In doing so, they can become experimental (Last, 2012b). Accordingly works have experimented with content and sought to engage key geographical ideas (Driver, 2013; Hawkins and Lovejoy, 2009; see Isé, 2016),[64] such as in social (Sacks, 2007), cultural and institutional contexts (Triscott, 2012; Gould, 2005), or location (White, 2011), by producing artworks not 'traditionally' seen as art, in spaces not 'traditionally' associated with art (White, 2011; Coolidge and Simons, 2006).

For art, the creative (re)turn means artworks can become more inclusive and received in outlets outside art, potentially expanding its audience and helping question the perceived-elitism often associated with traditional art spaces (Sholette, 2003). For Geography, it demonstrates a way to fold uncertainty into the research

[64] The artist discussed in Isé (2016), Tomoko Takahashi, is reported in Hawkins (2010b).

process (Dwyer and Davies, 2010; DeSilvey, 2007a). Caitlin DeSilvey (2007a) shows this through her work on a derelict, abandoned Montana homestead, a dwelling whose randomness and seeming lack of logic in everyday curation[65] attracted her to it. As she progressed through sorting the chaotic collections, she embraced artistic practice which she described as 'a model for folding uncertainty into the act of inventory itself, while retaining a focus on the seductive presence of actual materials' (DeSilvey, 2007a: 885). Fundamentally, for DeSilvey, that very same disruption and uncertainty which drew her to the homestead can remain, uncertainty offering flexibility and freedom to follow a material and research-led study without requiring definitive cessation points or 'finished' products.

However, according to Hawkins (2010a), as part of this creative (re)turn geography must attend to art's 'sites, spaces and processes of its production, consumption and circulation' (2010a: 808), looking beyond artistic production's attributes and spatialities, to consider its consumption and circulation too. This considers its existence *in the world* rather than as a 'finished' output for consumption. Consequently, characteristics important for contributing to the finished output, such as 'skill' level involved in its production, become less relevant than the act of simply producing it (Hawkins, 2015; Madge, 2014).

While not necessarily explicitly disputing this, Marston and De Leeuw (2013) warn geographers must be careful not to portray a facile appropriation of artistic skills; doing so underplays artists' skilled practices. But in the creative (re)turn's engagement between geographers and creative practitioners, so it is also an opportunity for each to *share* expertise and these subsequent skills beneficial to one another (see Dwyer and Davies, 2010). Williams (2016) identifies reflection of this in geographic literature, engaging with 'skilled practices' such as taxidermy (Patchett, 2008; 2014), and artistic techniques (Mann, 2015; Patchett, 2014; Yusoff, 2007; Butler, 2006) such as video ethnography in taxidermy (Patchett, 2014), archives (Yusoff, 2007) and sound walks (Butler, 2006).

As these above engagements show, utilising each practitioner's skillset can be fruitful. Geographers use their skills in conceptualising spaces as layered and social

[65] The Art of Curating (2014) discuss a good example of this.

in conceptualising power hierarchies, modes of analysis, and considering difference when reading cross-disciplinarily (Marston and De Leeuw, 2013). Artists meanwhile use their skills of being attuned to the material, emotional, spatial, textual, and processual (Engelmann, 2015) needs of not just the artwork, but the concepts invoked by it. And these skillsets overlap, and not just in formal collaboration. For example, artistic practice is highly politicised (Rancière, 2004; 2002) while early forms of geography relied on aesthetic understandings and visual ideals such as maps and paintings to flourish (Dixon et al., 2012).

For Williams (2016), this increasing engagement with creative research showcases this overlap between art and Geography, and does so explicitly, enabling 'a mode of enquiry into the *way* artistic products and practices can help geographers to frame and think about the world differently' (2016: 1; emphasis added). Or, put another way, the processes of creativity act as tools for 'sites of knowing and thinking rather than only as a means of production leading to an output' (Hawkins, 2015: 264). For geographers, this provides new conceptual and analytical tools to think with and enacts a novel method of conducting geographical research. One of these methods involves using 'artistic practice as research'[66] (White, 2014b; McNiff, 2013; Mareis et al., 2011). Artistic practices do not just help frame and interpret the world but are used as a method of research (Mareis et al., 2011) with artworks also being used as knowledge themselves (White, 2014). Fundamentally, engaging with different techniques for both artists and geographers helps expand the horizons of knowledge (Hawkins, 2011b), moving beyond traditional scholarly practice. For Hawkins (2011b), this symbolises a new approach to knowledge production where the horizons of both art and Geography are expanded[67] (see Geoghegan, 2010; 2009; Mauthner and Doucet, 2008). She argues

> '[i]n short, intersecting fields of Geography and art might not merely offer one field as a model or form of critique for the other, but rather could instead demand that we move beyond the existing horizons of both' (Hawkins, 2011b: 241).

[66] This notion is discussed further later in the chapter.

[67] For Schaaf et al. (2017), using a mix of artistic and geographical methods can 'go beyond the representational and towards more creative 'world-making' modes' (2017: 320).

This thesis posits one way of moving beyond the 'existing horizons of both' (ibid) is through artists' engagement with institutions. Both White and Pell have created their own institutions at the OOE and the CPNH respectively, both of which utilise geographical research and artistic practice as research. In creating their institutions, White and Pell are producing both artistic and geographical research *for* their institutions, rather than seeking to somehow unite geographical and artistic practices. In this way, institutions can bring together research from Geography and art which is beyond the existing limits of each and produce new forms of knowledge as a result.

2.2.2. Materials and materiality

Questions of creativity often entail questions of materiality (see Williams, 2016), materiality being the form creativity is conducted *with* and *on*. In experimenting, artists have sought to integrate materials into different parts of their practices, including in the research process itself, as tools to think with and as ways of knowing, in the physical manifestation of an embodied practice,[68] or in generating meaningful haptic encounters (Paterson, 2009). I now explore some of the ways geographers have engaged with different forms of materiality as part of creative and artistic practices.

Since Jackson's (2000) urging of Geography to 're-materialise', geographers have engaged with materiality in a few select ways (see Tolia-Kelly, 2011), of which three notable ones Anderson and Wylie (2009) identify. The first considers meaningful practices of encountering and using specific objects and/or surrounding environments (DeSilvey, 2006; Edensor, 2005; also Hill, 2007). The second involves complex materialities of science and technology alongside forms of 'nature' (Hinchliffe et al., 2013; Lorimer, 2012). The third centres on a material essence, such as affect, emotion, touch, or a materiality of corporeality (Engelmann, 2015; Meyer, 2012; Hayes-Conroy and Hayes-Conroy, 2010; Hetherington, 2001; see Whatmore, 2013).

[68] See Scalway (2006) for an example of how she uses drawing as a way of knowing, using the physical tools to leave a physical trace of her way of knowing.

The first of these ways is drawn on in this section, highlighting how materials have been previously used as part of the experimental system. As previous engagements between artists and geographers have shown (Engelmann, 2015; Warren, 2012; Foster and Patchett, 2007), the materials chosen in artistic practice derive from the artist's practice in each artwork, and can be used as tools to consider encounters with objects and environments (Patchett, 2008; Foster and Patchett, 2007). I now consider how this has been used in previous engagements between artists and geographers.

Materiality has been drawn on in engagements between artists and geographers because they bring together both art and geography. For Williams (2016), there are creative practices involved in materiality such as re-arranging, re-framing, and contextuality which showcases 'the nascent creativity in […] materiality' (2016: 3). Materials need collecting and curating (Cresswell, 2013; DeSilvey, 2006; 2007a; 2007b) to be displayed, while institutions such as museums often use them to represent particular narratives (Geoghegan and Hess, 2015). However, they can also be used by geographers interested in studying the geography of their agency (Hetherington, 2003), circulation (Hilton, 2004; Cook et al, 2000; Koptyoff, 1986), and use in institutional settings such as galleries, museums, or disciplinary educational organisations (Driver, 2013; Hill, 2007). Materials, then, can embody wider social and cultural relationships between agents, and can also be used creatively by creative practitioners to evoke particular effects depending on their curation, display, and context. Materials can convey key themes in artworks, and in this way are critical to this thesis.

Artists are engaging with different kinds of materiality. One kind of materiality, as reported by Paton (2013), is dynamism. To make this point, Paton uses a quarry as an example of sculpture, arguing it resembles a 'material stream', something changing over time and comprised of surfaces and familiarities which are porous. For Paton, matter is sentient rather than necessarily stable. It imbues a particular time and context, reflecting Tilley (2004) who argues that 'our relations to the world of things is a materiality, a process of navigation' (in Paton, 2013: 1075). And these relations change over time, changing our processes of navigation. For Ingold (2011; 2007), this sentient understanding rejects a marked distinction between human and

substances which, he argues, has become signified in recent materiality discourse. Instead, it represents a necessary engagement with objects beyond their surface and advocating a 'flow of meaning through the material itself' (Paton, 2013: 1074). This sentient understanding of materiality draws comparisons with the land artist Robert Smithson, whose work and perception of materiality was hugely influential on Neal White's. According to Smithson (in Flam, 1996), 'solids are particles built up around flux, they are objective illusions supporting grit, a collection of surfaces ready to be cracked' (1996: 107). For Smithson, then, solids are dynamic. They progress with time, and moving towards an eventual decay where they change form.

A second key kind of materiality artists have engaged with concerns animals and their display in taxidermic practices. Previous taxidermy studies have often used objects in their 'finished' state, such as behind glass, positioning them as *products* of taxidermy, or 'frozen temporal sections' according to Haraway (1989: 42). However, Tolia-Kelly (2013) and others (Forsyth et al., 2013; Cresswell and Martin, 2012; Merriman, 2012) have highlighted the importance of getting 'beyond' matter's surface in such a frozen temporal state to 'uncover underlying meanings, motivations, power relations, 'feelings', and processes of production' (2013: 1013). To an extent, the animals bodies and display act as process-resultant, showcasing the processes of its production. However, for these authors the *contexts* of production help uncover social and cultural relations present in the object but hidden from view in their finalised, 'polished' form. This is what Patchett (2008) seeks to discover through recovering 'the practices and relationships that brought specimens to their state of enclosure, inertness and seeming fixity' (Patchett, 2008: 18).

In a collaboration with artist Kate Foster, Patchett (2008) sought to demonstrate the historically-overlooked part of this 'polished', output-driven practice by examining its *process*, arguing that studying the taxidermic object shows only what the practices *produce*, thereby neglecting the process. For them, the process is messily engaging with the 'blood and guts' part often censored from the finished product (Patchett and Foster, 2008; Star, 1992). For Patchett and Foster, they sought to get '…under the skin and behind-the-scenes to show how specimens have been entangled 'in life' as well as how we have creatively taken part in their 'afterlives'' (2008: 98). Patchett and Foster draw attention to a marked distinction between the animal's life and the

dead animal being perceived as an object – its subsequent 'after-life' – which reflects how process is interpreted differently from output depending on the object's living state.

However, according to Baker (2000), perceptions of output in taxidermy are mistaken. For him, the animal objects themselves reflect process, something Baker refers to as 'botched taxidermy'. Far from witnessing only the finished output where something seems 'to have *gone wrong* with the animal' (2000: 58; original emphasis), the animal *represents* the process by its display. Baker clarifies this in his definition of botched taxidermy, stating:

> '…a botched taxidermy piece might be defined as referring to the human *and* to the animal, without itself being either human or animal, and without it being a direct a representation of either. It is an attempt to *think a new thing*' (2000: 77; original emphasis).

For Baker, then, taxidermic animals are 'perhaps things with which to think, rather than themselves being things to be thought about' (2000: 77); they represent tools for inspiring broad thought rather than being the *focus* of thought. For this reason, they are often used in museum displays to prompt reflection *across* displays rather than just *of* displays.

However, Duncan (2003) has reservations about museums' tendency to display objects without being attentive to '…the collecting practices and underlying political-economic conditions that have allowed, indeed expected, one society to collect, display and interpret and radically recontextualise the products of another' (2003: 17). As Duncan highlights, showcasing objects and using them to tell stories as is often the case in museums can be problematic, neglecting the very processes, decisions, and cultures which created them, while necessarily re-contextualising them.

Further, knowing which fragments to pull together into a coherent narrative is difficult and individual-dependent, but each object is also an amalgamation of social ties which, Latour (2005b) argues, are very difficult to grasp. Accordingly, objects tend to be used in two main ways. First is through its impact on that individual object (see

Patchett and Foster, 2007), and second is through its impact on its species (see Patchett et al., 2011; Meyer, 2007; Winker, 2005; Callon, 1986), though Ryan (2000) questions such a representation's authenticity. Using these objects in these two ways utilises these two models of exhibitions as 'a vehicle for the display of objects or a space for telling a story' (Karp, 1991: 12) to animate immobile objects.

Using taxidermy in a museum in this way creates an object-person relationship between exhibits and visitors (Geoghegan and Hess, 2015; Geoghegan, 2010; Kirshenblatt-Gimblett, 1988). This relationship is shaped by the different uses of objects (Meyer and Woodthorpe, 2008; Hill, 2007; Meyer, 2007; Pinney, 2005; Pels et al., 2002). For Jude Hill (2007), she uses her work on amulets[69] –– to argue objects can be spectres of enchantment (Geoghegan, 2014; Woodyer and Geoghegan, 2013; Bennett, 2001). On one level this enchantment is *removed* by the objects' exhibition behind glass, but on another level it is *ignited* through disrupting the narratives of evolution and progress in the museum's remainder. Objects, then, when utilised accordingly, can become tools for enchantment and cultivating curiosity.

However, to be in museum holdings requires collection in the first instance, which is a complex process. Cresswell (2013) and DeSilvey (2007a; see also 2007b; 2006) discuss the significance of collection in their pieces on gleaning at Maxwell Street's markets in Chicago, and sorting a derelict homestead respectively. For Cresswell, Maxwell Street's gleaners raised considerations of classification; '[w]hen faced with the market they seemed unable to sort the confusion they were confronted with' (2013: 164). What to keep and discard; what's valu*able* and value*less*. DeSilvey (2007a) noted a similar problem when attempting to sort through the contents of the derelict homestead, articulating her difficulty through Ilya Kabakov's art installation entitled *The Man Who Never Threw Anything Away* (1998). Kabakov's installation centred that tension, a man confused in determining value. Like with the Maxwell Street gleaners, '[a]ll criteria for selection became untenable, because everything had a possible future use' (DeSilvey, 2007a: 886; see also Ashmore et al., 2012).

[69] Amulets are objects often associated with beliefs around containing various healing and protecting powers for their owners.

Both examples highlight the individual context in valuing an object. The gleaners' valuation of what to keep differed from the merchants', being able to collect objects seen as unsellable and therefore waste by the merchants. Conversely, for DeSilvey, her decisions were on behalf of the people who commissioned her to sort through the estate. She felt the need to justify objects in the collection to her commissioners, aiming to align her valuations with theirs. Consequently, '[h]undreds of items remained outside the collection, virtually indistinguishable from the ones inside it' (2007a: 888). Both Cresswell and DeSilvey allude to value in the perception of objects, particularly in collecting, and show how these perceptions of value differ between individuals and contexts (Bourdieu, 1984).

For Cook and Woodyer, objects imbue part of the identity of ourselves and others; '[t]hrough things, we make sense of ourselves and our relations with others. Through things, we express and maintain social relations' (Cook and Woodyer, 2012: 231; Geoghegan, 2009; Miller, 2008). Consequently, choosing the right objects to use is critical for expressing the intended narrative to visitors. Objects are '…bound up with the lived lives of many anonymous folk, the places they inhabited and the embodied materialities of the objects they became associated with' (Hill, 2007: 77). Fragments of previous layers are reworked, assembled and interwoven into new layers, rehabilitating them in doing so (DeSilvey, 2007a; 2007b; 2006; Edensor, 2005; Lorimer and MacDonald, 2002; Neville and Villeneuve, 2002; Buchli and Lucas, 2001; Benjamin, 1999). It is, as Driver (2013) aptly puts it, 'a matter of looking a familiar material with fresh eyes' (2013: 423; see also Geoghegan and Hess, 2015).

Re-assembling[70] fragments allows different stories to emerge. Whilst this has issues relating seemingly unconnected material together (Lorimer, 2009) requiring researchers to manipulate and displace (DeSilvey, 2007a), nonetheless doing so and forming unconventional archives holds 'both significant creative and political potential' (Patchett and Foster, 2008: 107; DeSilvey, 2007a). Re-assembling, then, offers one way to produce different stories. Another is what DeSilvey (2006) terms 'the disarticulation of a cultural artefact' (2006: 329), which, she argues, can produce

[70] I use 're-assembling' here to demarcate from restoring; a marked distinction in perception between utilising fragments to produce novelty and seeking restoration, itself different again from repair (Graham and Thrift, 2007). Re-assembling therefore does not seek recreation but instead to reconfigure traced threads, looking forward to build (Patchett, 2008).

an articulation of other histories. Disarticulating a cultural artefact can allow other stories to emerge by removing the emphasis formerly placed on an aspect of it and allow attention be paid on others. Or, put in Smithsonian terms, emphasising different parts of the artefact to emphasise a different narrative represents another change in form, a progression towards the objects' gradual decay.

According to Williams (2016), recognising this agency of objects and the creativity of materiality means that '[i]n this way, we move towards an understanding of materiality as active and away from seeing phenomena in the world only positioned after the sensing subject' (2016: 6). For Williams, then, this involves a fundamental re-configuring of how objects' are perceived, by recognising their creative potential in and of themselves. Materials, then, are creatively used as part of artistic practices and offer potential for exploring key themes and relaying particular narratives, especially in institutions. They represent ways of knowing for artists and visitors, as well as actively constituting the artwork. However, their agency also ensures they can tell their own stories, producing different interpretations for different individuals and practitioners. They thereby represent opportunities for expressing new forms of knowledge as 1) tools to think with; 2) physical manifestations of key narratives; or 3) experimental forms of engaging or disrupting visitors to reflect on the artwork's key themes.

2.2.3. Aesthetics and the distribution of the sensible

In this section, I turn to consider how particular artistic sensibilities in the experimental turn have been mobilised by aesthetic understandings. In light of the creative (re)turn and the uses of materiality artists are increasingly experimentally engaging with, I discuss aesthetics to contextualise how these engagements relate to wider understandings of visibility, perception, and sensibility of art and artistic engagements. These are questions of aesthetics, and relate to the 'distribution of the sensible' (Rancière, 2004; in Sayers, 2005), both of which I now discuss.

Harvey (1990) called for geographers to appreciate the range of understandings of aesthetics, which, he argues, has multiple understandings. Sacks (2007) agrees, but

for her centres aesthetic understanding around the opposite of the anaesthetic, 'the opposite of numbness' (2007: n.p.). By her argument, it provides meaning, feeling, value, or *any* response to particular sensibilities or types of numbness. Emotional, physical, mental, visual, individual, any potential 'numbness' interpretation. And this is her point. That aesthetics are greater than any *one* understanding of it, or any *one* way of engaging with it. Consequently, it has more than *one* way of interpreting it, which makes decisions about how it's encountered by visitors and participants in artworks and spaces important for artists when designing their works. The aesthetic is multiple and must be understood as such.

Harvey's (1990) call is echoed by Hawkins and Straughan (2015), arguing appreciating this range of understandings will aid in providing 'the space and means to consider how critical thinking about aesthetics can enable us to take seriously the contributions aesthetics can make to [Geography]' (2015: 286). As previous notions of the Sublime have shown (Dixon et al., 2012), notions of aesthetics have historically been powerful. But, in response to more recent fears over perceptions of an aesthetic singularity, Hawkins and Straughan (2015) argue appreciating aesthetics' diversities brings out the scope of contributions available, highlighting the contributions such thinking and engagement with aesthetics can have for Geography.

However, as Hawkins and Straughan (2015) recognise, attempting to streamline or hierarchise one notion of aesthetics misrepresents 'the way the discipline is currently working with and through aesthetics to engage and expand its fields of study' (2015: 284) for geographers. I therefore heed calls from prominent geographers for a more nuanced development of aesthetics (Dixon et al., 2013; Kinsgbury, 2010; Matless, 1997; Harvey, 1990).

I do this by applying the Rancièrean notion of aesthetics to artists working with institutions, drawing on the Rancièrean understanding because it brings together a notion of a complex, multiple aesthetics with art. For Rancière (2006)

> '…aesthetics is not the theory of the beautiful or of art; nor is it the theory of sensibility. Aesthetics is an historically determined concept which designates a specific regime of visibility and intelligibility of art, which is

> inscribed in a reconfiguration of the categories of sensible experience and its interpretation' (Rancière, 2006: 1).

Aesthetics for Rancière, like Sacks (2007) and Goldman (2005), extends beyond something visual, artistic or sensible. It concerns interpretation, context, and the intelligibility and visibility of art, and 'sensible experience'. Aesthetics, for Rancière, are a way of perceiving something, informed by what he outlines. He considers aesthetic practices to be those 'forms of visibility that disclose artistic practices' (Rancière, 2004: 10). Accordingly, aesthetics also links to the questions this thesis seeks to explore around post-experimental turn notions of experiments, and around social practice, by involving interpretation and context, while highlighting the potential role of institutions in shaping these interpretations and contexts. This notion of aesthetics considers the wider contexts and implications of visuality, artistic practices, and sensibility by exploring how interpretation and context change these in both experiments and social practice.

For Rancière, the wider contexts and implications of visuality, artistic practices, and sensibility are political questions, and are demonstrated through his concept of the 'distribution of the sensible' (2004; in Sayers, 2005). The distribution of the sensible refers to 'a set of implicit rules and conventions which surround the divisions between what is visible and invisible, sayable and unsayable, audible and inaudible' (Sayers, 2005: n.p.). This questions *who* distributes the sensible, *how* the sensible is distributed, and is derived from institutions (which are discussed further later in this chapter) which establish and guide these rules and conventions. The manifestation of these powers are political, and so too are the distinctions between the visible and invisible, sayable and unsayable, audible and inaudible. Rules and conventions are set by those in power and are distributed according to their wishes (see Foucault, 1980a). This link of political and aesthetics, according to Rancière, is indissociable from aesthetics and vice versa (Sayers, 2005).

For Rancière, then, aesthetics poses political questions. These questions emerge out of a complex relationship between politics and artistic practices, according to Dixon (2009). She argues:

> ‘[A]rt [is] an important ensemble of practice, performances and artefacts because it provides an opportunity for reflection […]. Artistic practices are not autonomous from the political, nor are they political because of the message they send. Rather, they are both a particular form of politics *and* are capable of commenting on politics in itself’ (Dixon, 2009: 412).

Artistic practices, for Dixon, then, imbue political sentiment, either as complicit or resistant to the time period’s dominant politics, and can engage with political rhetoric as an act of political expression. The founding of the social and political systems Dixon argues art can provide reflection on, stems from the distribution of the sensible which is itself an ‘aesthetic order’ (Sayers, 2005) and shapes perceptions of *aesthetics*. Worldviews, social, and political systems are linked, and impact on social practice and experimentation through determining social and cultural interpretation and context.

Rancière also highlights the importance of artistic practices, notably because ‘art alters the distribution of the sensible’ (in Tanke, 2011: 73). Rancière (2002) argues artistic practices ‘suspend the ordinary coordinates of sensory experience and reframe the network of relationships between spaces and times, subjects and objects, the common and the singular’ (2002: n.p.). Given the pre-existing link between aesthetics and politics, a tri-lectic emerges which invokes artistic practice, but also shows social practice as dependent on people whose perceptions of artworks is contingent on the above.

Rancière reflects on this relationship artistic practices have with aesthetics and politics using three regimes, which further explore exactly how ‘an object, act, process or practice is understood as art’ (in Davis, 2010: 127). The three regimes are:

1) **Ethical regime** which considers an image, for example, through 1) faithfulness to the idea and 2) its effects on community
2) **Representational regime** which questions conventions and the codified systems of norms through which art is rendered and known (Davis, 2010); ‘[…] determines what can be the subject of art, into what genre it should be placed, and how it is to be depicted’ (Tanke, 2011: 80)

3) **Aesthetic regime** which abolishes the hierarchical distribution of the sensible which is characteristic 'of the representative regime of art' (Rancière, 2004: 81); it removes the rules of the regime involved in coupling a particular subject with a particular mode of presentation (Tanke, 2011), and instead considers that which 're-interpret[s] what makes art or what art makes' (Tanke, 2011: 82).[71]

In outlining these three regimes amongst the sensible, Rancière argues for a perceptive aesthetics; *how* people perceive things, and what sensibilities inform these perceptions. But they also consider how the norms which inform people's perceptions and sensibilities come to be embedded and imbued, questioning the political and social structures of their production. These have implications for art: what can be seen as art and its effects on community, in the ethical regime; questioning conventions and norms which art comes to be decided and known, in the representational regime; abolishing hierarchy and the coupling of a particular subject with a presentation mode to re-interpret what art makes or what constitutes art, in the aesthetic regime. Art is therefore not just dependent on context, but can also influence the context of its production through its complex relationship with aesthetics, and therefore is politically involved.

The implications these three regimes of the distribution of the sensible have on art are identified by Bourriaud (2002). He argues artistic activity 'is a game, whose forms, patterns and functions develop and evolve according to periods and social contexts; it is not an immutable essence' (2002: 11). Aesthetics *informs* and has implications *for* art, which, through challenging one – or sometimes multiple – regimes, alters the distribution of the sensible. Artworks can, then, invert or upset elements of the regimes, prompting reflection on existing norms and structures often internalised, such as those of institutions.

[71] These three regimes correspond to their commencement in different time periods. The ethical regime commenced the furthest ago, pre-19th Century, the representational after and the aesthetic the most recent. But they all run simultaneously with each other, continuing to the present day (Tanke, 2011).

The relationship between aesthetics and politics, then, implicates artistic practices through their perception by visitors and participants. This tri-lectic is shown through the distribution of the sensible, which decides the limits of the visible, sayable, and audible. However, artistic practices can also alter the distribution of the sensible, altering the limits of what is visible, sayable, and audible by inviting reflection on existing structures. This has implications for social practice, with the *participants* rather than the artist[72] determining what these limits of visibility, sayability, and audibility are. Aesthetics, then, can be seen to be contingent on the political, social, and cultural norms, which the participants of a social practice artwork can be seen to be at once a part of, and have the potential to alter.

2.3. Using locations

In 1979, art critic Rosalind Krauss argued the spaces of art's production were expanding, as part of what she termed art's 'expanded field' (Krauss, 1979). She used the example of sculpture in the wave of installation art to show how perceptions of it – and art – were changing, identifying a progressive move towards art increasingly operating and being situated 'beyond studio and gallery space' (Hawkins, 2013: 53).[73] All the artists and artist-led groups discussed in this thesis relate to this conceptual understanding Krauss draws on, situating themselves as a direct response to it.

By theorising an expanded field, art was no longer confined to a (physical) space such as the gallery or studio, and could therefore be situated in, and use, different locations. Accordingly, it could draw in and on different groups of people, moving away from being (physically) output-driven in specific 'artistic' spaces. For Hawkins (2011b), this radical bridge between traditional analytic understandings of art and

[72] Here, the implications of participants – rather than the artist – determining these limits are pertinent because the artist is intentionally a practitioner operating outside of disciplinary constraints. Art is intentionally something non-disciplinary to allow freedom of ideas. It is likely, meanwhile, that participants – though some might also be artists – will have members who are not, and thus do not necessarily operate from the same conceptual or political stance as the artist, and therefore might not be aware of the structures the artist is drawing attention to.

[73] Sjöholm (2014) has written about how the traditional spaces of art, notably the studio, can be used for alternative purposes, giving an example of its potential role as an archive for artwork's production.

mid-20th Century arts practice carved a space for uptaking sets of ideas considered geographical, such as place, space and site. Such considerations opened conceptual space and produced interest in areas beyond the artwork itself, considering their context. Subsequently, artistic practices and artworks involving considerations around ideas such as site – like those engaged with in this thesis – have a distinct geography to them, and relate to geographical ways of understanding them. The artworks' location(s), then, are important for conveying its meaning but also relate to other conceptions of locations and how they are used, such as by institutions, allowing new forms of knowledge and understanding to develop from putting artworks in unconventional locations.

For Hawkins (2013), art's expansion encompasses a range of media, away from traditional settings, and, along with its uptaking of ideas considered geographical, have seen this expansion carry over to its use in Human Geography. Notably, this has implicated site, with many artworks involved in recent geographical literature using an array of formats, reflecting Krauss's assertion that 'many different mediums might be employed' (Krauss, 1979: 43). These have included using bus tours (Davies, 2010), experimental museums (Davies, 2014), installations in science museums (Hawkins, 2010b), and remodelled deer shelters (Warren, 2012) as components of – or whole – artworks.

This focus on (the) particular (limits of) spaces is critical for understanding how institutional spaces come to be associated with particular processes and protocols. Notions of the laboratory, for instance, have been and continue to be essential to notions of experiments, relating to the space(s) where experiments happen (Kohler, 2002a). A key part of White's practice at the OOE relates to the *spaces* of experiments and where these spaces are, what the limits of the laboratory are, and who can experiment in them. Throughout the history of the physical sciences, the spaces of experiments have become increasingly protocolled, which White seeks to alter and invert in creative ways. Pell, however, uses the cues of an existing institutional space – in his case, a museum – to experiment with what can happen in an institutional space. The CPNH draws on the established protocols associated with museum space and invites questions the role of those in the space – are they there to passively absorb the information available? Or can they contribute to it? Can they

talk to others if they're unsure? In this way, White can be seen to be experimenting *with* the spaces, while Pell experiments *in* these traditionally institutional spaces. In this way, both White and Pell build on Krauss's 'expanded field' notion to utilise the expanded spaces in which artists can contribute and through what means, as I discuss further in Chapters Five and Six.

2.3.1. An expanded social practice

Following discussion earlier in this chapter about materiality constituting artworks, social practice augments this understanding. In social practice, rather than materials comprising the artwork, instead *people* are the focus of the artwork, being the means by which the artwork is relayed. I now discuss this in more detail.

Following a greater artistic interest in context, setting, and relations – all shown to have aesthetic implications – from art's expanded field (Krauss, 1979), I now consider a practice which has followed a wave of use by geographers: social practice. To outline the term 'social practice', I draw on Cara Jordan's (2017) work which recognises the artist Joseph Beuys' late-1960s term 'social sculpture' as influential on contemporary social practice. For Jordan, Beuys' social sculpture was underlined by a belief that 'art could include the entire processes of living – thoughts, actions, and dialogue, as well as objects' (Jordan, 2017: 2; see also Tisdall, 1979) which meant non-artists could enact it. Its focus on this interdisciplinary dialogue translated through into the post-1990s 'social practice', which Jordan (2017) describes as being focused on the artist-audience relationship, and 'characterized not only by its performative nature, but also by the diversity of its audiences, pedagogic intentions, and politically charged themes' (2017: 1).

As part of social practice artworks, site has been used to enhance performative works, interdisciplinarity, pedagogy, and politics (see White and Rowell, 2016; Triscott, 2012; also Coolidge and Simons, 2006; Wilson, 2002). These often involve experimenting with site, such as through bus tours (see Davies, 2010; Coolidge and Simons, 2006), shifting resources to an online location (Debatty, 2012; White, 2011), using traditionally non-artistic spaces like those of traditionally 'scientific' practices

like a laboratory (see Triscott, 2012), or perceiving 'site' as social and shifting it to the audience (Hawkins, 2013; see Kwon, 1997). These changes follow the expansion of art beyond studio and gallery space to incorporate expanding and developed methods of artistic practice such as social practice.

Recent re-configurations of the social 'site' have developed ideas of social practice (Hawkins, 2013). Following the cultural turn of the 1980s and 1990s towards the symbolic and the representational, Kwon (1997) amongst others (see also Jackson, 2011 and Rugg, 2010) identified the site as social. For Kwon, it was constituted by people and relations across space and time, developing understanding of site as community. In this understanding, study instead focuses on the *relations* the site results from rather than its physicality.

Social understandings of site emphasise its constituents. Its constituents are involved in site's production, but their existence also comprises the site. The social both created and continues to produce the site through relations. Social practice advocates an approach drawn from this, artworks focusing on the means, rather than a polished 'final' product as, according to DeLyser and Hawkins' (2014), 'the polished, published work obscures the means of its production' (2014: 131).

However, this is problematic. For example, on the one hand, social practice might be seeking the social elements in producing the artwork rather than a finished 'polished' output, but on the other the artwork is produced to a standard before participants experience it. Artworks are highly stylised and polished to ensure they reach participants in the artist's desired way. So an element of polished output remains, regardless of whether social practice is used (see Sacks, 2007).[74]

According to Williams (2016), social practice requires challenging perceptions of the lone, creative artist and their output of creative genius. For Bourriaud (2002), recognising the artist is not a lone agent is crucial, noting '[n]o one writes or paints alone' (2002: 81). For Bourriaud, artists instead produce artworks resulting from the connections in their social networks. Jordan (2017) argues this again draws from

[74] Sacks (2007) highlights this tension, describing her desire in using the social in artworks to be both 'process and goal' (2007: n.p.).

Beuys' social sculpture, helping visitors recognise themselves as part of a more powerful, networked collective rather than just an individual.

Fundamentally, then, re-configuring understandings towards an artistic practice *in process* ignites an understanding of co-constitutive artworks and social relationships of site. These are not just between artists and participants, but between artists and other people, a re-configuring which helps promote research *through* artistic practices and prevent 'assumptions that easily slip back into research *with* [my emphasis] an artistic person or product' (Williams, 2016: 2).

However, using people as the means of an artwork in social practice guarantees difference. People are living, thinking, lively beings which means no two artworks will be the same. Artworks then depend on who is there at the time, and what their reactions are. So social practice involves people (Nabulime and McEwan, 2010) social interaction, and it also involves context (see Pain, 2004). Social practice works, then, produce unique meanings for each person depending on context. The artist Richard Serra once remarked about context when challenged about the positioning of his 1981 work *Tilted Arc* that 'to move the work is to destroy the work' (in Weyergraf-Serra and Buskirk, 1991: 38). For Serra, context is *that* important. The work is time-, location-, and person-specific in its meaning. Consequently, social practice is not limited by the traditional 'art' and art spaces associations such as an object hanging in a white-walled gallery, and includes the 'here-and-now' fleeting encounter (see Cook et al, 2000).

A striking example of using people in a social artwork was artist Shelley Sacks' *Exchange Values* project (reported on by Cook et al, 2000) which tracked the global journey of bananas from producer to consumer. 20 randomly selected boxes of bananas from the Windward Islands had the bananas' skins stitched together and these 'sheets of skin' (Exchange Values, 2016: n.p.) were installed in a space alongside recordings from the growers played through headphones. She examined the social relations implicated and involved in their production, her work since being exhibited internationally (Sacks, 2007). In *Exchange Values*,

> '[…] [t]he need for what Joseph Beuys described as the 'permanent conference' [an ongoing exchanging and debating of ideas (Tate, 2017)] is

> emphasised. ‘Visitors’ quickly become aware that they are not *visitors* in the global economy. Each of us on the planet is engaged in complex relations with people and other life forms. Here, at the table and in the installation, we can begin to live into the questions and let the images and experiences work in us. This experiential-reflective process is designed to mobilise us internally and enhance our ability-to-respond’ (Exchange Values, 2016: n.p.; original emphasis).

She drew on Beuys’ social sculpture to produce an artwork in the late-1990s to showcase to visitors their active role in the global economy. Visitors are part of a much larger system rather than existing on their own, and their reaction to the artwork shapes the artwork. Sacks invites all visitors to *Exchange Values* as artists, as every bit an artist as she is as they contribute to the banana trade as much as she does (Sacks, 2007).

In relaying an audio clip of Vitalis Emmanuel, the banana farmer for batch E490347, in front of that batch’s banana skins stitched together (Cook et al, 2000), the site of the artwork is social. The site is both Emmanuel and the visitor, the visitor being one of the consumers which batch E490347 went to. ‘Here’, Sacks says, ‘the means is an integral part of the social sculpture’ (2007: n.p.); that is, *how* the banana skins came to be displayed at that location. In other words, the process. For Sacks, the process’s purpose is essential to its appropriate use. The process’s value for her is not in its instrumentalism – a tool to achieve the output – but instead in the process itself.

For Cook et al (2000) *Exchange Values* puts the visitor-cum-artwork in connection between the artist and prop. But visitors are also responsible for the artwork, and being put in such a position evokes different experiences of the artwork. However, for Cook et al (2000), it also has implications for what he terms ‘connective aesthetics’ (see also Gablik, 1992). Connective aesthetics are a sense of connection between different actors in the banana-producing chain evoked by an artwork where the visitors *and* the banana farmers are the constituents. And everyone else who eats bananas, for that matter. Cook et al (2000) sums up:

> ‘Embodied knowledges. Things that are hard to describe. But can be powerfully felt. Connectivity. Collectivity. Connective aesthetics. That’s what’s being sculpted here. They fold in and leak out. It’s a social sculpture. Made out of dialogues and things. […] This is not a didactic piece. It’s not polemical. It’s not art with ideas hung on it. It’s ideas and things which have grown tighter. Have been shaped by the countless people involved in its life. And it’s not dead yet. […] This isn’t about connective aesthetics. It *is* connective aesthetics. An emerging, expanded process. Drawing in and on all kinds of connections. It’s not Shelley Sacks’s creative work. Alone. […] It’s [the banana farmers’] creative work. *Our* creative work. Collective. And connective. Creating a reflective space. A space of possibility. Where connections can be seen. Felt. Thought through’ (2000: 341-2).

Cook et al and Sacks, then, use art to consider implications of the banana trade, a process which relies on consumers, implicating every banana consumer as a participant in this social practice piece. Or, as Hester Parr (2007) might term it, art’s role in ‘participative social geographies’ (2007: 114), something she considered in her collaborative film-making project in mental health research. In doing so, she recognised the importance of creative processes in negotiating meaning. She states:

> ‘…the *process* of film-making has been at least as important as the *product* of this collaborative project, if not more so. It is through creative processes such as this, and the unscripted negotiating of meaning through the *doing* of film, that the significance of arts work for this group comes alive and becomes more accessible’ (Parr, 2007: 131).

For Parr, then, as for Cook and Sacks, the most meaningful element of the artwork was its production, highlighting the role of process in negotiating meaning.

I have shown social practice to be useful for considering the implications of the artwork’s key themes. Using social practice allows the participant to critically reflect on key themes, and is a method many of the artist-led groups and artists I discuss in this thesis use to engage with contemporary issues in science and technology. However participants also take the artwork wherever they go with them, because

they corporeally comprise it. The artwork has no termination point and is therefore continually engaged with rather than just in a set space, site, or location. Crucially, with enough participants a shared understanding can emerge and potentially lead to institutional change, which I discuss in the next section.

2.3.2. Institutional engagements

This section brings together institutional engagements from the art world and Geography. It grounds current understandings of institutions among historical understandings, situates the institutional relationship this thesis' artist-led groups and artists are responding to, and outlines how geographers have previously engaged with different aspects of institutions. Against this backdrop, it carves a space for considering the most recent wave of institutional critique involving artist-led parallel institutions to be engaged with by geographers, which this thesis seeks to do. In doing so, I outline the relationship between the social and institutions, highlighting why many of the artist-led institutions this thesis discusses implement social practice for their artworks.

In art and Geography, engagements with institutions have been varied. For the art world, institutions were perceived negatively during the second half of the 20th Century (see Tate, 2016d). Art's engagement with institutions emerges from perceiving institutions as groups of individuals practicing what become accepted norms. Institutions can be assumed to be complicit, go easily unnoticed, and be seen as part of the day-to-day fabric which artworks operate within. But they can also be seen as sites of negative power imbalances (Philo and Parr, 2000) and be resisted *against*. Some artists and artist-led groups seek to push back against specific institutions,[75] and this institutional pushback framed wider institutional critique which developed as a wave of artistic criticism aimed at challenging the perceived spaces and function of art in society throughout the mid-late 20th Century.

From the 1960s, art institutions were seen as places 'of 'cultural confinement' and thus something to attack aesthetically, politically and theoretically' (Tate, 2016d: n.p.). Institutional critique subsequently emerged from questions over art's role in

[75] Such as Critical Art Ensemble against science within neoliberalism, for example, or the Museum of Jurassic Technology against scientific distinctions of truth and fallacy.

society and its associated spaces, becoming a way to rally against institutional power and it's shackling of artworks and objects. It initially focused on institutions based in the art world, and was advocated by prominent artists such as Marcel Broodthaers, Hans Haacke, and the conceptual artist Daniel Buren.

As Alberro and Stimson (2009) identify, institutional critique[76] spawned four main waves. Its first wave was concerned with critiquing how artworks and objects were institutionally framed by artistic spaces, attempting to question institutional assumptions and ways of perceiving works. In the second wave, it sought to critique the artist's role, as well as the accepted spaces of art. The third critiqued the *process* of institutionalising, such as how an institution comes into being and can be altered. The fourth and final[77] wave sought an exit from existing institutions altogether by producing new, alternate institutions which existed *in relation to* existing institutions but not *inside* them where possible.

As successive waves of the institutional critique movement progressed, then, institutions started to be seen not just as the problem but part of the solution too (Tate, 2016d). Drawing on art history's lineage of these waves of institutional critique (Lind et al., 2010), art theorist Gerald Raunig (2009a; 2009b) draws on the fourth wave to posit an augmented approach to critiquing institutions. He sees institutions in need of tweaking, rather than abolishing. Social movements and even revolutions, Raunig argues, are still embroiled in and implicate institutions, remaining 'just as little immune to the occurrence of structuralisation, rigidification and institutionalisation' (Raunig, 2009a: 174). Fundamentally then, Raunig shows the impossibility of creating an absolute outside the institution. He argues if one wants to critique an institution, they must critique their own understanding as well.

According to Raunig, for institutions to be effectively 'corrected' – as things not so shackling they create oppression – institutional critique has to be joined together with other such approaches in areas besides art history. Once acknowledged as occupying spaces not free from institutions and institutional domination, such

[76] Sheikh (2006) also gives a brief overview of institutional critique waves.

[77] Other artists and theorists (e.g. Raunig, 2009) have argued there may be waves beyond just the fourth, however these tend to augment current approaches rather than changing focus in a wave.

institutional critique can be considered an *attitude* to inform all subsequent forms of institutions created in response. Raunig speaks of a relationship between this attitude and a form of practice, and which he summarises:

> 'Now, if institutional critique is not to be fixed and paralyzed as something established in the field of art and remaining constrained by its rules, then it must continue to change and develop in a changing society. It must link up with other forms of critique both within and outside the art field – whether these forms emerged in opposition to existing conditions or were the resistance that provoked those conditions in the first place. Against the background of this kind of transversal exchange among forms of critique – but also without naively imagining spaces somehow free from domination and institutions – institutional critique needs to be rethought as a critical attitude and as what I call an 'instituent practice'' (Raunig, 2009b: 3-4).

For Raunig, then, instituent practices are an *attitude*, not an art- or discipline-specific/-shackled contextual critique. They must transcend disciplinary divisions, to become a critical attitude. More effective, for Raunig, then, is to situate practices in relation to existing institutions, using instituent practices to underpin future institutions.

There is overlap here with two other ways of engaging with institutions by artists. The first is Maria Lind's (2006; in Lind et al. 2010) proposed 'pseudo institutions' which, rather than distancing themselves from institutions, seek to open a critique of institutions by embodying much of them 'within new models of organisation, knowledge and function' (White, 2013a: 56). Here, an institution would be set up mimicking an existing institution, but by changing the institution's context it serves to showcase the flaws of that institution in an active critique of existing institutions.

The second is Angela Last's (2016a; 2016b; 2015) term 'parallel institutions', institutions which emulate the current state institutions to give provisions for essential services such as food, housing benefits or healthcare (Last, 2015), though they are not limited by these foci. They are often borne out of 'a dissatisfaction with state institutions' disenfranchisement of entire sections of population who fall outside of their stewardships' (Last, 2016a: n.p.). Where Last differs, is by suggesting parallel

institutions should aim for offering *alternatives* to the major institutions rather than critiques of them. Rather than overtly critiquing institutions, Last's 'parallel institutions' instead offer an alternative institution operating in conjunction with existing institutions, in spite of their flaws. They represent an attempt to start new institutions similar to current institutions but to service different needs. They also constitute experiments, asking how people or society can move beyond culture (Last, 2016b); that is, creating something beyond the currently prevalent institutions in society, constituted as 'culture'. Throughout the thesis, I however refer to parallel institutions in the context of art and artist-led institutions,[78] such as parallel institutions either led by artists or with a significant artist contingent.

These examples show how problematic some artists find engaging with institutions. In experimenting with institutions, artists have sought to provoke new questions around their creation and maintenance. In this thesis, the institutions artists are engaging with are to stimulate engagement with publics about science and technology. They can take many forms, and relate to the questions around experimental geographies that Thompson and ICI (2009) refer to, such as the implications these institutions have for wider relations between cultural, social, political, and environmental relations. This thesis aims not to pin up one kind of institution as the universal example but instead to explore *how* particular institutions have been *created*. By what processes were they created? By whom? For what purpose? How were they enacted? Why did they take that form? What goal were they seeking to achieve?

Geographers, meanwhile, have had limited engagement with institutions previously, and not always directly and explicitly. Some engagements include Geoghegan's (2010) exploration of museums, Butler's (2006) conception of institutions as spaces of display, such as museums and galleries, Philo and Parr's (2000) work on the mental asylum, Davies' (2000) work at the BBC's Natural History film unit, while others have alluded to institutions such as in collaborative art projects (Mar and Anderson, 2012), or their implicit presence in geopolitics (Szary, 2012; Mitchell, 2007). These, however, ignore institutions less spatially grounded, such as linguistic

[78] However, other literature uses different conceptions of parallel institutions (see Last, 2016a; 2016b for example).

utterances bringing institutions into being like declarations of war (see Austin, 1975) or marriage (Niedomysl et al., 2010; also Bailey, 2009). Institutions can be so large they underpin entire sub-sections of a discipline, such as Marxist Geography, or Economic Geography in the case of capitalism. Geography, nay, academia is an institution (Foster and Lorimer, 2007), within a capitalist economy which are two further institutions.[79]

Considering institutions' breadth, morphological variety, and complexities, more recently geographers have engaged with institutions to differing degrees. On one level, institutions are spatial, occupying a physical space (Davies, 2000) dedicated to them such as mausoleums (MacDonald, 2005),[80] museums (Geoghegan and Hess, 2015), or hospitals (Nagasawa, 2000; Philo and Parr, 2000). However, institutions also have spatial *relations* – that is, relations existing across space – both internally and externally. Davies (2000), for example, recognises these relations, perceiving institutions as existing beyond a constrained, shackled entity. She employs Actor-Network Theory (ANT) in her work on the BBC Natural History Unit, a sociological theory arguing for the intertwining of humans and non-humans in complex, fluid, dynamic networks (see Law, 1994). For Davies, ANT represents a way to consider three 'modes of ordering', (Law, 1994), a notion to explain how institutions use order in their inner and outer workings. Through these modes, she rationalises the actors (i.e. those acting in a network) and networks involved *inside* the NHU. For her, this ANT approach to institutions is geographical, given that '[m]odes of ordering have spatial dimensions' (Davies, 2000: 542). For instance, 'they may generate and perform distributions' (Law, 1994: 111), such as how something is ordered determining *how* it's distributed across space, *who* distributes it, and *where* it is distributed to and across. Institutions, then, do not just exist *in* space, they also exist *across* space.

[79] This highlights the enormous breadth and scale of institutions which can prove difficult to engage with. They are intimidatingly broad, and everyone has different ideas of what an institution constitutes, the word 'institution' evoking particular understandings for each person (see Austin's (1975) conception of an institution comparative to Foucault's (1980a), for example).

[80] MacDonald (2005) provides an overview positing similarities between institutions and mausoleums. Similarities include their aesthetics, (dim) lighting, quiet and gentle tones of audio, and a sense of revering the contents. The claim was strongly refuted by Alberti (2009), arguing '[t]he museum was not a static mausoleum but a dynamic, mutable entity where specimens were added and preserved, discarded and destroyed' (2009: 143).

Holloway's (2000) understanding of institutional *geographies* reflects this complex, ANT approach. Institutions, Holloway argues, are processes requiring constant effort and upkeep (see Mills, 2003), and are always 'on the way to becoming the immutable and enduring domains as given in the (social) order of things' (2000: 553). Institutional geographies, Holloway argues, are constantly in flux.

This fluid conception of institutions helps understand why artists have engaged with them. It shows an institution is a 'dynamic, mutable entity' (Alberti, 2009: 143), meaning *any* institution – regardless of size, tradition, following, or anything else – can be changed. As the ANT approach to institutions shows, institutions are not individual and singular, but instead bound up in multiple, complex networks with other ideas, people, and institutions. Any of these represents a node which can have an effect on an institution. For example, in creating pseudo institutions (Lind et al., 2010) or parallel institutions (Last, 2015), artists can create a trigger which they hope prompts change within a wider institution by highlighting the wider institution's flaws, either implicitly or explicitly. Showing this institutional dynamism reminds individuals they can choose which institutions they implicate themselves in, giving artists scope for altering thinking around their targeted institution.

Billo and Mountz (2016) build on Davies (2000) and Holloway (2000) to demonstrate this complexity of institutions and the various levels change could happen across. Billo and Mountz provide a study of institutional ethnography (IE) in their work which, they argue, 'offers the possibility to […] understand the differential effects of institutions within and beyond institutional spaces and associated productions of subjectivities and material inequalities' (2016: 199). Where Davies (2000) used ANT to examine the spatialities of institutions *inside* institutions, and Ashutosh (2010) considers operations beyond the institution's *architecture* – like the quotidian and subjectivity – Billo and Mountz seek to expand understandings beyond the *physical spaces* of institutions. They call for use of and engagement with IE both beyond and within Geography as a means of looking

> '…within, through, and beyond the architecture, policies, texts, and problematics of the institution to understand how, why, and for whom. […] [T]heir ethnographic mapping across sites and scales is essential to

> advance understandings of political, economic, and social relations' (Billo and Mountz, 2016: 215).

Billo and Mountz thus consider several different conceptual, infrastructural, and spatial layers of the institution as a relational entity as an assemblage of different relations.

IE does however, as recognised by the Billo and Mountz, have two conceptual flaws. Firstly, through attempting to document the complexity of the institution through networks, relations, and across scales, it produces an 'aspatial understanding of institutions' (2016: 502), creating a tension with previous spatial engagements of institutions (see Latour and Yaneva, 2008; Foucault, 1980a). This also highlights the difficulty of engaging with institutions' complexities; engaging with one element of institutions complicates or neglects another. Secondly, it seeks a golden bullet and ignores the essential complex and messy nature of everyday contexts and relationships *with* and *in* institutions (Meyer and Woodthorpe, 2008; see also Law, 2004).

This second flaw is something Latour and Yaneva (2008) have related to. They use the example of buildings to show how a seemingly static existence is misleading, even for buildings. For Latour and Yaneva, the Euclidean drawing by geometric representation mistakenly portrays buildings as static, non-transitional units. Rather, they are a manifestation of the processes allowing the building to come about, be built, and experienced every day. Its existence as a building is only one part of its journey through time. 'Euclidean space is the space in which buildings are *drawn* on paper but not the environment in which they are *built* – and even less the world in which they are *lived*' (2008: 82). The *context* of the building changes and 'moves along and flows just as buildings do' (2008: 87), arguing the building exists to one person differently to another. The building, then, can exist in two different ways to two different people with different contexts experiencing it, showing just how messy and complex relations and contexts with institutions can be.

Part of this messy-ness is derived from the social constitution of institutions. For some (Philo and Parr, 2000), this social constitution can represent a negative power balance between individuals in key institutions using their power to oppress others.

Philo and Parr (2000) define an institution to be 'an organisation considered in relation to the effects of its internal structure and operating constraints on how it acts' (2000: 515), with these constraints crucial in power dynamics. In their case of the mental asylum, Philo and Parr argue these institutions 'seek to restrain, control, treat, 'design' and 'produce' particular and supposedly improved versions of human minds and bodies' (2000: 513). The mental asylum therefore seeks to hold its inhabitants to a standard of human behaviour, dictating *when* and *how* this standard is achieved.

However, Philo and Parr's (2000) conception of an institution is problematic. Firstly, it is not that simple. Power relations 'are multiple; they have different forms, they can be in play in family relations, or within an institution, or an administration' (Foucault, 1988: 38). They are not uniform, but equivocal. So too are institutions (see Callon et al., 2009; Star and Griesemer, 1989), and their relation to power is multiple and complex[81] (see Allen, 2016). Secondly, Philo and Parr's assertion also implies a restraint *from* something, restraint being required to maintain order, almost like its inhabitants of the institution fight against this restraint and control. It implies oppression (Foucault, 1977) but oppression for its constituents' own good; to prevent them deteriorating into un-restrained savages. Their intention may be to reflect this understanding on to the institution itself, but the language of the *definition* represents what Philo and Parr want the *defined* to be. Institutions do not have to be negative (Foucault, in Mills, 2003), whilst restraint suggests a simplification of what are complex and multiple power relations (Foucault, 1988).

Further, Philo and Parr's (2000) definition ignores overlaps and the different types of institutions which contribute to society's everyday moral fibres: they are ubiquitous in contemporary society. They are not just Western and modern forms like prisons, hospitals, and research institutes, but also marriage, and declarations of war (see Austin, 1975). They are so ubiquitous, 'so innate and 'natural' do these […] appear that we find it hard to conceptualise what life would be like without [institutions]'

[81] Star and Griesemer (1989) outline 'boundary objects', objects existing at the boundaries between the need to generalise findings and divergent viewpoints. They are 'both adaptable to different viewpoints and robust enough to maintain identity across them' (1989: 387). They are required because of divergent institutions colliding with one another, and instead seek to connect them with these 'objects' where possible. Callon et al. (2009) argue for knowledge's translation into different phases to compensate for different audiences from different institutions.

(Foucault, 1980a, in Mills, 2003: 44). Dissociation from any institution for comparison accordingly becomes problematic (Foucault, 1980a). How can institutions restrain their constituents when the alternative, un-restraint, is unknowable? Mills (2003) concludes using Foucault, arguing:

> 'If power is relational rather than emanating from a particular site such as the government or the police; if it is diffused throughout all social relations rather than being imposed from above; if it is unstable and in need of constant repetition to maintain; if it is productive as well as being repressive, then it is difficult to see power relations as simply negative and as constraining. At the same time as downplaying human agency in resisting oppressive power relations, through his concentration on the diffusion of power, Foucault also provides the means to formulate resistance' (in Mills, 2003: 47).

For Foucault, then, the complexity of power relations rejects a stance of institutions as negative entities, and argues they instead provide a means to develop resistance to oppression. It is this opportunity for breeding new forms of behaviour which attracts artists to institutions by offering opportunities for alternatives to current systems. Because of institutions' social constitution, an institution can be altered if enough people seek such change. Therefore, by artist-led groups creating their own institutions, they can start to develop a following for issues important to them. This situation might potentially offer opportunities for alternative futures to current institutions, either through pushing back against existing institutions or inspiring interest in these alternative institutions.

The importance of institutional power is shown through Jane Tooke's (2000) work. For her, institutions are critical in producing and maintaining the status quo, the 'routinised and normalised' (2000: 567) taken-for-granted activities, signifying the accepted behaviour assumed in particular circumstances or instances. She discusses the 'stable and enduring relations' (2000: 573) which institutions embody, sometimes mirrored in the investment into physical institutions such as Richard Pell's physical CPNH building. Crucially, 'institutional spaces can be viewed as more than the practices performed at any point in time-space', Tooke argues, 'as they are the

effect of social practices that have accumulated over time to produce enduring socio-spatial relations' (2000: 569). For Tooke, then, institutions are not just involved in practices performed at a particular time, but also are a product of – and contribute to – an institutional legacy. So despite existing within each period of time and space (see Derrida, 1995),[82] their enduring existence into different generations highlights their existence as greater than their situation in a particular period of time and space.

Geographers, then, can help recognise the forms of institutions and their ways of operating – be it spatially, socially, culturally, and temporally across networks – as well as their relations to people, ideas, and other institutions. However, despite engaging with institutions, geographers have scarcely engaged with artist-led institutions,[83] though the reasons for this I can only speculate on given the opportunities this presents. Artist-led institutions represent an insightful opportunity to consider nuances of institutional relations with experiments and participants through engaging with creative practices in novel forms of knowledge production. As Thompson and ICI (2009) highlight, the link between art, experiments, and Geography involves some significant structures and institutions:

> 'The field of experimental geography (and many other interdisciplinary practices) derives from […] moments of theoretic rupture. They are born when the extant frame is not wide enough and we must begin to understand the mechanisms of power, finance, and geopolitical structures that produce the culture around us' (Thompson and ICI, 2009: n.p.).

Thompson and ICI use the example of the Center for Land Use Interpretation (CLUI), a research non-profit organisation based in Culver City, LA, USA, to discuss how conceptions of landscape and cartography can be shaped by CLUI. But such an engagement remains one of the few. For these reasons, this thesis seeks to develop this further, and uses institutions – one of which also happens to be CLUI – to explore this area further.

[82] Derrida (1995) discusses at length the link between archives and institutions; their control of state memory, of power, history, and social relations.

[83] Though, there are notable exceptions to this, such as Davies' (2010) work with the OOE, and Thompson and ICI (2009) at CLUI.

As Thompson and ICI (2009) allude to, institutions can shape perceptions of phenomena. Institutions are also critical in shaping perceptions of aesthetics, and aesthetic practices are implicated in artistic practices. Although artistic and aesthetic practices are markedly different, as Rancière (2006) outlines, 'understanding the nature of […] experience[s] and the properties [aesthetics] encompasses will take us a long way toward understanding how we evaluate and why we value art works' (Goldman, 2005: 255). Artistic practices do not have to follow the constraints of disciplinary protocol like another discipline might, providing the freedom for reflection for the artist and the artwork's visitors. For Rancière (2008), there is a link between aesthetics and institutions which implicates how artistic practices and artworks are perceived. This link is discussed in his argument of the 'aesthetic community' Rancière (2008), which is explained in three stages.

Individual conceptions of aesthetics can, when aligned with other similar conceptions of aesthetics, produce a collective understanding of aesthetics. This is the first level of what Rancière (2008) terms the 'aesthetic community'. Individuals 'put a white sentence on their black tee-shirt and they choose a certain stance to present to the camera' (2008: 4).

A conceptual frame is added which highlights two different sensorial worlds, the world individuals are in and the world they desire. This prompts the community to take on a particular figure, the target of their frustration, what Rancière terms a 'dissensual figure' (2008:4). This becomes the second level; it 'stages a conflict between two regimes of sense, two sensory worlds' (2008: 4-5). This progresses to the third and final level of the aesthetic community. According to Rancière,

> '…the philosophical proposition shows […] the tension between being together and being apart plays on a double level. The artistic 'proposition' conflates two regimes of sense – a regime of conjunction and a regime of disjunction. Now the community built by that dissensus stands itself in a twofold relationship with another community, a community between human beings. This is the third point' (Rancière, 2008: 5).

The third level therefore acts as the integration of the new regime into the rest of society, occupying space in the 'community between human beings' (Rancière,

2008: 5); individuals to community to society. As individuals alter their thinking, individuals together form groups and eventually institutions, institutions with new core values and identities. Such a powerful entity sparks a change in approach to it, prompting changes at both the commercial and governmental level to reflect new ways of thinking, such as feminist movements throughout the 20th and 21st Centuries. Foucault agrees with this line of thinking, arguing '[i]ndividuals are the vehicles of power, not its point of application' (Foucault, 1980a: 98).[84] [85] [86] [87]

In this section, I have outlined key notions underpinning institutions, and their engagement in the art world and Geography. After outlining previous engagements artists and geographers have had with institutions, I argued how the social comprises institutions which the artist-led institutions this thesis engages with seek to maximise by implementing social practice in their works.

2.4. Conclusion

This chapter has built on Chapter One's engagement with experimental geographies to outline engagements between art and Geography relating to 1) practice and 2) location. As Last (2012b) identifies, part of the attraction and novelty of involving art in experiments is the venturing out into the unknown (Gross, 2010; Ronell, 2003). Fundamentally, this venturing out changes experiments from a focus on finding

[84] However the reverse can be true, sentiments expressed about what aesthetics *should* be filtering down to the individual through accepted norms. The more influence governing powers exert on individuals, the more it conditions individuals to fit its system (Schwartz, in TED, 2015). It, too, can create further institutions. Institutions are shaped by both individual and state politics, and both of these can also influence individual and collective notions of aesthetics. This dualism influences both politics and aesthetics.

[85] See Larsen's (1999, in Bishop, 2006) notion of 'social aesthetics', which integrates the aesthetic and social understanding of each other. Social aesthetics 'can't be observed alone and in this sense the term is double bound. It says that the social probably can't operate in a meaningful way without the aesthetic and vice versa, hence both the social and the sphere of art and aesthetics inform it' (Larsen, 1999; in Bishop, 2006: n.p.).

[86] See Buttimer's (1976) 'lifeworld' notion, defined by Buttimer to be the 'culturally defined spatiotemporal setting or horizon of everyday life' (1976: 277). It relates the individual with the cultural, explaining how the individual resides in the cultural.

[87] There are shared understandings of particular kinds of aesthetics and their perception, some of which have been considered by geographers and social theorists before: in particular institutional settings such as museums (Geoghegan and Hess, 2015; Alberti, 2009; Classen and Howes, 2006; MacDonald, 2002), in personal domiciles (Horton and Kraftl, 2012; DeSilvey, 2007a), and in landscape (see Morris, 2011; Wylie, 2005).

answers, to asking new questions (Davies, 2010); questions of ideas, people, and institutions, and the relations between them which engagements between art and Geography are well-placed to explore, question, and critique.

This chapter has argued the creative (re)turn is part of a wider move within engagements between art and Geography towards understanding new forms of knowing which are material and social. They relate to art's wider situating beyond a spatial confinement (Hawkins, 2013) to creatively use new spaces of art, using a broadening of materials, ideas, and people in new ways to engage with institutions. Artistic practices are expressed as ways of knowing, in material practices, and in social artworks, awakening particular aesthetic sensibilities and visibilities towards institutions.

Additionally, the chapter highlighted the social potential of social practice, and discussed institutional critique to highlight how the art world has historically positioned itself in relation to institutions as part of four successive waves of institutional critique. Crucially, these relate to institutional *spaces*, questioning the limits of these. This section also highlighted how artists are increasingly using artistic practice as research to produce new, artist-led 'parallel' institutions to set their own protocols and experiment with visitors through social practice.

This chapter has highlighted the key debates this thesis seeks to contribute to, and these manifest in the upcoming chapters. Chapter Three explores the thesis' methodology, building on experimental approach taken by the artist-led groups and artists outlined thus far. It tackles the key question of how one might go about collecting and analysing empirical material on artists when the researcher is a social scientist. The literatures explored in this chapter are picked up again in Chapters Four, Five and Six, while key conceptual contributions are returned to in the thesis' conclusion, Chapter Seven.

In Chapter Four, I build on the theme of experimental geographies – which runs throughout the thesis – to introduce the practices of five different artist-led groups, all of whom have links with White and/or Pell. These groups are outlined, along with the reasons by which they were identified and focused on, in Chapter Three, before I explore how each of them experiments with different modes of institutions to interact

with different facets of science and technology in Chapter Four, attending to RQ1 in doing so. Engaging with different modes of institutions reflects different levels institutions operate on, such as socially, spatially and conceptually. To attend to these different levels, these groups each use different experimental practices, which returns me to notions of experiments. In particular, I attend to how experiments can be used by artists and/or artist-led groups, and the implications for a 'distribution of the sensible'. Each of these groups also has a relation to institutional critique, corresponding to different waves of institutional critique in the art world. In this way, the chapter also acts a potted chronology of the progression of institutional critique and concludes with groups corresponding to the fourth wave through their parallel institutions. As part of the discussion around these parallel institutions I move on to explore how White's and Pell's parallel institutions relate to each of the groups in this chapter. I highlight how their parallel institutions are well-placed to examine the creative and experimental potential of parallel institutions as vehicles for critiquing existing institutions. For this reason, White's and Pell's parallel institutions – the OOE and CPNH respectively – are explored in detail in Chapters Five and Six respectively, exploring in detail their practices as manifest in these institutions.

Chapters Five and Six show how both White and Pell are experimenting with institutions in different ways, continuing the experimental theme of the thesis. White and Pell both use different forms of social practice in their practices, drawing on discussions raised in this chapter to exemplify how social practice can be used to enact social change. Both chapters therefore show how the shift from output to process – as manifest in the creative (re)turn – is reflected in artistic practices seeking to implement social practice. Chapter Five establishes a foundation of showing how these key debates manifest in a case study, and reflects this chapter's focus on movements in the art world relating to the social and spatial. In Chapter Five, I explore how White draws on these movements as part of his artistic experiments to critique these social and spatial arenas of science and technology, as focused on in RQ2.

Chapter Six takes the discussions around experiments, social practice and the creative (re)turn in a different direction. Chapter Six seeks to engage these debates through discussions of materiality raised in this chapter, as well as exploring the

manifestation of aesthetics in key institutional spaces such as the museum, given the focus on the museum-like CPNH. These represent the means through which Pell uses the CPNH as an accessible platform for experimenting with public understanding of science and technology, which RQ3 speaks to. The CPNH exhibits act as opportunities to provoke discussion around the scientific and technological processes, protocols and ethics which led to their creation.

Then, in the thesis conclusions in Chapter Seven, I seek to pull the thesis literature and empirics together to round up the key kinds of arguments the thesis looks to make. I map the contributions these artist-led groups and artists have made to experimental geographies through the examples raised in Chapters Four, Five and Six as related back to the debates covered in this chapter. These are documented through stating the thesis' key contributions which I build as the empirical chapters unfold.

3.0. Using experimental methods for experimental artists: Researching in the field

3.1. Introduction

In this chapter, I outline the thesis' methodology. First, I introduce methodologies employed by other geographers exploring artistic practice. I identify five key approaches geographers have taken when working with artists. These five approaches involve 1) collaborating to produce a specific work; 2) studying artworks to discuss theory; 3) using 'artistic practice as research' (e.g. Banfield, 2015); 4) studying a specific artistic practice to link ideas together;[88] and 5) using quantitative methods. After identifying these five approaches, I discuss each in turn. I then outline how my project differs and which of these five key approaches I draw from, as well as what methods I drew on from these considerations. Then I discuss the methods and their associated literature in detail.

The next part of the chapter explores how I enacted these methods by securing access to key sites and personnel. I then move on to discuss how I firstly researched the network of artist-led groups engaging with contemporary science and technology; secondly researched the work of – and collaborated with – Neal White's Office of Experiments; and thirdly researched Richard Pell's work at his CPNH. Finally, discussion moves to how data was analysed. Here, I consider the several tensions involved in data analysis, such as making sense of the data, its organisation, how they were analysed, the results garnered, and how as the research process unfolds it influences data's collection and analysis. This chapter, then, highlights the two experimental methods I used: using a form of artistic practice as research[89] to participate in producing an exhibition, and employing ethnographic methods across different sites to understand the influences White's and Pell's practices derive from.

[88] Though points 2) and 4) seem similar they have different aims. Studying the works of an artist relate to each artist's specific way of thinking and practice, whereas studying a specific practice to infer about the artists using it is focusing on the practice as a way of inferring about how artists use that practice.

[89] Here, I wish to make clear I was not producing my own personal art as part of the research process; rather, I was contributing to realising someone else's – in this case Neal White's – artwork by assisting in producing and utilising exhibition space to ensure it portrayed the artwork appropriately for its unveiling. I used others' practices as a form of research about their projects, researching how they see the world.

This chapter forms the platform which builds towards the next three empirical chapters, with the methods from this chapter being used to trace a network of artist-led groups engaging with science and technology in Chapter Four, and explore White's and Pell's practices in Chapter Five and Six respectively.

3.2. Researching artistic practice in Geography: Previous engagements

Previously, geographers have sought to engage with different kinds of artists in different ways relating to different analytical questions. Geographers such as Hawkins (2015), Engelmann (2016b; 2015), Paton (2013), Miller (2017), and Warren (2012) have tended to examine different kinds of artists' practices in five key ways, which I now cover in more detail.

In the first way, geographers such as Hawkins (2015) have collaborated with artists to produce a joint artwork. This geographer-artist collaboration acts as the research process, researching not participant *observation* but participant *co-production*. Harriet Hawkins (2015) used this approach with artist Annie Lovejoy, whose *Caravanserai* work Hawkins was a geographer-in-resident for in 2009,[90] and spawned the collaborative publication *insites* (Hawkins and Lovejoy, 2009). Originally studying *Caravanserai* as part of her geographer-in-resident research, Hawkins became increasingly involved in the project through her ethnographic research, until a decision was taken to collaboratively produce a book. For Lovejoy, this process showed her that 'to work together might mean making something together' (Hawkins, 2015: 249). The resulting publication manifests what Hawkins (2015) summarises as a process where, 'our mutual concerns with place came together in the context of our research processes' (2015: 249). Hawkins' participation

[90] Hawkins was geographer-in-residence for Lovejoy's *Caravanserai* work in 2009, attempting to invert the perception of artists needing to contribute something to art-Geography projects through a residency, and instead apply it to geographers. *Caravanserai* sought to help engage with and further develop the 'interdependent relationship between local residents and visitors, between village and campsites and between many local networks and societies' (Lovejoy and Dunlop, 2017) by focusing on campsite residents at Porthscatho in Cornwall. Lovejoy credits Hawkins in helping think through key ideas related to *Caravanserai*. Lovejoy states: 'For Harriet to be 'geographer-in-residence' was to have the opportunity to think amidst creative occupations of place, to critique the concept of 'residency' in the context of terms such as dwelling, duration, mobility, community and connectivity' (Lovejoy, 2017: n.p.).

in and study of *Caravanserai* alongside Lovejoy's participation in Hawkins' ethnographic study allowed a better understanding of each other's practices to emerge, the manifestation of this research being the book. Their collaborative work thus allowed them both to produce research through their working together.

The second way is by geographers such as Engelmann (2016b; 2015) and Mackenzie (2004) using artworks or individual artists to pull together theory, using it to demonstrate theoretical points. Here, the geographer studies the artists' practice or artworks. One example is Sasha Engelmann (2015) who used interviews as part of a discussion of the visual artist Dryden Goodwin's[91] *Breathe*. Goodwin's *Breathe* was a project highlighting London's air pollution using animated drawings of his five-year-old son in different stages of breathing. Engelmann draws on Goodwin's *Breathe* to argue how 'sequencing'[92] and 'surfacing'[93] in the project highlights 'the relevance of creative practices for inventive modes of registering the materiality of air and atmospheric space' (2015: 441) which further presents 'a metonymic diagram for a collective airy attunement and witness, a speculation that is as political as it is poetic' (2015: 441). Accordingly, Engelmann's empirical research was studying *Breathe*, which she then uses to suggest new ways of conceiving of air's materiality and politics.

The third way is where geographers use artistic practice as research. In these, practice itself is the research method, offering contributions distinct from the typical social science methods (see Banfield, 2015; Paton, 2013; Scalway, 2006). For artist Helen Scalway, artistic practice, in her case drawing, offers a way of researching by questioning phenomena's spatial representation. Her (2006) work exploring patterns on textiles from India in Tooting, London, prompted her to confront a key question of how to understand and represent this cosmopolitan city:

---

[91] Goodwin's practices often involve drawing, much like the visual artist Helen Scalway who I come on to later.

[92] Engelmann uses sequencing to show how the act of breathing re-conceives air from something passive and intangible to something which has to be actively pulled in by the lungs and appears as solid when inside lungs.

[93] Regarding how Engelmann uses surfaces, she states 'the term 'active surface' is both a unique way of describing Goodwin's drawing style, and a metaphor for perceiving the way the artwork functioned within the spatial context of its site. Goodwin conceptualised his practice in terms of rendering a surface that generated particular aesthetic experiences (in terms of the image's fragility, legibility and robustness) on a panoramic scale' (2015: 438).

> ‘By what visual patterning forces and processes might the experience of this urban space be understood and represented? Could there be a mapping/modelling in terms of the diverse visual patterns it presents, and what part might be played by investigating the discontinuities within and between patterns?’ (2006: 452).

Drawing, for Scalway then, represents a way of deciphering, exploring, and addressing these questions. In drawing, she orients herself through negotiating how these questions might be answered, representing a mode of corporeal knowing. In other words, drawing, for Scalway, is a way of *knowing* through the act of producing an artwork. Using drawing in this way represents an embodied way of researching over other visual methods I draw on in this thesis, such as photography and taxidermy.[94] Further, this idea of artistic practice as research is also implicated in several artworks and artist-led groups and organisations,[95] some of which have been written about by geographers (see Beisel and Boëte, 2013; Davies, 2010) and others I come on to discuss in Chapter Four.

In the fourth way, geographers like Miller (2017) and Morris and Cant (2006) have studied artists’ practices to explore how artistic *practices* are not just embodied practices, but also embody the artists’ self-expression of the ‘material, social and political knowledges which interweave in artists’ lives’ (2017: 245). In this way, such geographers attempt to use artists’ practice to link artists’ ideas together. Miller (2017), for example, uses the practice of ceramic art to ask questions of ceramic artists rather than focusing on the ceramic artists to ask questions of ceramic art. For Miller, artworks are underpinned by artists’ practices, while practices also shape the artworks’ construction as they are the means by which the artwork comes into being. So he links them together by examining practice to follow this extension. ‘To understand art-making’, he writes, ‘…both these more-than-artistic practices of inspiration and material practices of making need to be thought of at once’ (2017: 247).

[94] Both photography and taxidermy use different ways to capture embodied practices from afar as part of ‘apprehending everyday rhythms’ (Simpson, 2012: 423; see Garrett, 2013; Simpson, 2011).

[95] Many of which White (2014) discusses.

Miller's (2017) approach is the reverse to other geographers' examining this relationship, given that many previous geographers have tended to employ 'methodologically conservative' (Latham, 2003) methods[96] such as interviews (Banfield, 2015; see also Hitchings, 2012), participant observation, and/or video filming (see Latham, 2003). These methods,[97] two of which I use in this thesis, allow conversation with the artist(s) to *explain* to the geographer to help understand the reasoning underpinning their practice(s). Given Geography's affinity for text-based sources to report their findings in academic outputs, communicating in language for a textual output has clear advantages for some geographers.

However, this can be problematic, as Janet Banfield's (2015) study of artists whose practice concerned 2D media discovered. For this study, she used a combination of interviews and practice-based research where she asked artists specialising in 2D media[98] to work with different forms of 2D media familiar and unfamiliar to them. She highlights the 'insubstantial and fragile nature of boundaries between practices and levels of proficiency' (2015: 1), noting the contingency of proficiency in a particular practice; artists could have chosen *any* practice and they chose *that* one. But crucially, Banfield also identifies differences between what participants *said* they did in their practice when interviewed, and what they actually *did* when in the act of making. So for Banfield, linking artists together based on practices drawn from what artists might *say* they produce can be problematic.

Finally, the fifth way geographers have used has sought to measure how effective an artwork was at eliciting a desired response among visitors at installation artworks in public (outdoor) spaces (see Meyer, 2016; Warren, 2012). Warren (2012) sought to contribute to a growing move to evaluate the 'impact' of artworks or art spaces (Pollock and Sharp, 2007; see Geoghegan, 2010). She used exit questionnaires conducted as visitors left James Turrell's installation art piece *Skyspace* in Yorkshire Sculpture Park, gathering their thoughts fresh from their experience.

[96] Hay (2010) outlines the range of qualitative methods available to human geographers, while DeLyser (2009) suggests how human geographers can write using qualitative methods. Yet despite this range, Latham (2003) argues human geographers have tended to prefer conducting research where they can be 'methodologically conservative'.

[97] The two methods of this list I use in this thesis are interviews and participant observation.

[98] Banfield (2015) takes 2D media to include 'drawing, painting, pastels and embroidery' (2015: 5).

However, this move towards an evaluation culture prompting ‘exit’ surveys or opinions produces several issues. Firstly, actions such as exit surveys or questionnaires assumes there is a distinct ‘exit’ point from the artwork, or that the artist sought such a termination point for their artwork. So ascertaining this set point is problematic. Secondly, such surveys assume that the newly-formed artwork-inspired thoughts are readily discernible and coherent while visitors are still connecting ideas from the artwork with their own. Further still, such surveys assume that the artwork’s effects have also been identified, qualified, and can be articulated effectively enough to be reduced to a Likert scale and closed questions, in the minutes between experiencing it and reaching its ‘exit’ point. For Warren, her methodological approach set out to examine whether visitor experience matched the artist’s intention, which becomes problematic in attempting to pin down the artist’s intentionality and therefore can be ‘measured’ against, and has a cessation point and set time frame. For these reasons, I caution the implementation of these particular styles of ‘exit’ methods.

Each of these five main engagements, then, uses different methods when researching artistic practice for different purposes. The first group seeks collaboration to contribute skills from both artist and geographer to participate in producing something, and to experience how the *artist* produces something. The second group uses artworks to crystallise key concepts around, and therefore have drawn on methods such as interviews to gain artist insight on what the artist feels they are contributing to. For the third group, geographers gain a new form of research from the act of *doing* artistic practice, while the fourth uses interviews and a form of artistic practice as an inquisitive tool for asking questions of artists’ political, social, and material knowledges, embedded in their practices. Finally, the fifth way highlights how quantitative methods are increasingly being used as part of charting ‘impact’ in artworks and spaces. The researcher, then, chooses the method they feel best fits their research.

However, artists’ creativity ensures there are as many potential methods for their work as there are researchers. Consequently no combination of methods for such creative outputs will be entirely appropriate. I therefore acknowledge that while the methods I chose had their merits, they – like any method(s) – also represented a

flawed and partial[99] perception of not just the artwork and artist's practice, but of my understanding of them too (Morton, 2014; Emerson et al., 2011; Ekinsmyth, 2002).

Partial worldview understandings influence the methods chosen to elicit such answers as each method has a set of assumptions regarding interpretation of apparatus, inferences, and results, drawn from previous uses of it in similar situations[100] (see Barad, 2007; Haraway, 2005, in Schneider, 2005; also Rheinberger, 1997). These assumptions underpin its use for particular studies, making them applicable for some studies and not for others. So the method determines not only the questions asked[101] but also the answers, the decision of both influenced by a partial understanding, and answers being a 'function of the methods used to obtain them' (Ekinsmyth, 2002: 179).

Given I was researching the practices of White and Pell, and not their effectiveness (Warren, 2012), I opted for qualitative methods to understand how their practices emerged, what their practices entailed, and what movements White's and Pell's work was conceptually contributing to. But most importantly, qualitative methods enabled me to follow connections, such as what Marcus (1995) outlines in his 'multi-sited ethnography' methodology, which I outline in the next section.

I sought to combine methods from the first, third and fourth groups, and did so for reasons relating to my research questions. To find out *how* White and Pell used sites and their institution respectively, I sought first-hand experience of these processes, opting to collaborate with White and undertake participant observation on-site at Pell's institution, the CPNH. I also used artistic practice as research, drawing on my

[99] Strathern's notion of partial connections is a framework for considering how understanding for the world is generated. She argues the world is ontologically multiple; that is, it is both a container of our knowledge about it, but is also contained by our knowledge of it. We cannot see all of it at the same time, and different people experience different worlds based on their engagement with, and experience of, it. These worlds exist simultaneously and are each an existence in their own right. They do not exist as one person's view of the world so much as a different world entity in itself. So whilst we enact partial knowledges of the world, we also enact holes, gaps in our understanding of it, accounted for by our partial understanding according to Strathern.

[100] Rheinberger's 'technical object', part of his 'experimental system' (1997) suggests this. So well-defined and understood is the technical object that it carries implicit (and sometimes explicit) assumptions and protocols over its usage and the results drawn from studies employing it as a method.

[101] The reverse is also true here; the questions asked also determines the method(s) used and therefore the answers to said questions.

experience of producing research towards an upcoming White project as a new way of conducting research. This thesis also tweaked the Miller (2017) approach of studying a practice to learn about artists using this practice, to use White and Pell's different practices to draw connections to areas beyond just their (conceptual) areas. White and Pell are not just *these* artists working at *this* particular site of art, such as social practice, but they also speak to *these* other areas, in their case science and technology, and institutions.

I supplemented these approaches with interviews to explore the theoretical contributions the artist-led groups aimed for their work to make, and explore how White's and Pell's work related to different aspects of science and technology. However, to undertake any of these methods I needed a physical basing in a location. As I had come to realise through preliminary research, many of these artist-led groups and artists were based in different countries. This reason, combined with the crucial experiential element in artistic practice, led me to choose an ethnography to research with, which I now explore further.

3.3. Using ethnography

3.3.1. Outlining the ethnographic approach

For my methodology, I was mindful that all research methods have their pitfalls, with 'the potential for exploitation, mis-representation and even damage' (Ekinsmyth, 2002: 183), so choosing the right combination of methods was critical. In this section, I outline the methodology I chose, which was ethnographic but also experimental in imbuing some of what Marcus (1995) terms a 'multi-sited ethnography'. I explain a central tension between ethnographic research and a 'multi-sited ethnography', highlighting how I researched multiple sites with different personnel, showing how it related to the methods I enacted at each site which are outlined in the next section.

When choosing my methodology, I explored a tension in the forms of ethnography I sought to use. I wanted to explore artistic practice by tracing their use, manifestation and understanding across different sites where key artistic personnel and ideas congregated. Given the artist-led groups and artists I would be researching were

internationally based,[102] I sought to use a methodology which could include the different sites of the network.

On this level, these outlined requirements bear resemblance to the anthropologist George Marcus's (1995) notion of a 'multi-sited ethnography'[103] as a framework. Marcus derives this notion from seeking a new methodology to challenge anthropology's conceptions of fieldwork sites which had previously tended to either consider an 'in/out' approach[104] to fieldwork or see differing sites only as useful for making direct comparisons between them. For Marcus (1995), spaces are more fluid, being operated *across* rather than in or out of. He outlines how in a multi-sited ethnography, the ethnographer traces something[105] important to their study. In my study, this was in the form of artistic practices.

However, on another level, ethnography is always multi-sited to an extent. To gain a deep understanding of a new culture, community or way of encountering the world invariably requires travelling to different sites to ascertain different approaches and perspectives to understanding. On the one hand, this thesis was following artistic practice across different sites. Therefore these artistic practices themselves were the object(s) of study, as manifest at the sites, and therefore the research was to be conducted on a lot of places. But on the other hand, the artistic practices were different depending on where they were based, in line with US and UK cultural differences for example. This made it also have an element of tracing artistic practices across the US and UK, and therefore the artistic practice – as the object of study – was multi-sited.

Geographers have previously taken both approaches, albeit in different circumstances. Regarding a using a multi-sited ethnography, recognising this fluidity of space has been appealing for geographers seeking to trace connections across space. Accordingly, geographers have used a form of a multi-sited ethnography

[102] Artist-led groups and artists I was researching (with) were based in different countries, including predominantly the US, the UK, and Belgium.

[103] The original multi-sited ethnography Marcus (1995) outlines was designed for a long research period at each site, generally totalling two years or more in the field. While I draw on the core ideas of his methodology, I have adapted this methodology to fit the reduced timescale I worked with.

[104] The 'in/out' approach Marcus refers to perceives as being either in a fieldwork site or not.

[105] These typically tend to be a person, an idea, or an object.

before. Cook and Tolia-Kelly (2010), for example, used it to study the complex cultural-economic relations in commodity chains and networks. Here, using this method enabled Cook and Tolia-Kelly to trace the chain of the commodity from where it was produced, how it was transported, where it was sold, who by, and so on. Appadurai (1986) also used a multi-sited ethnography for his 'social lives of things', and later underpinned Cook's 'followthething.com' project (see Cook et al., 2007; Cook and Harrison, 2007; Cook et al, 2006; Cook, 2004; see also Cook and Crang, 1996).

So, geographers have used a multi-sited ethnography across different areas of Geography. Following such successful usage of a multi-sited ethnography when following other 'chains' and 'things', it would have been easy to substitute artistic practice in for cultural-economic relations in the case of Cook and Tolia-Kelly (2010) or things for Appadurai (1986) or Cook (Cook et al, 2006). Other social scientists have made this substitution by using a multi-sited ethnography to work with artists (Marcus, 2016).[106] However, as Marcus (2016) noted, co-producing an artwork – as Marcus did – was less about following an object or process, like in conventional examples of multi-sited ethnography (Marcus, 1995; 1998). In this case, co-producing an artwork was about exploring particular ideas. He states

> '…though an object or process is not being 'followed', so much as a set of ideas is being explored by designing forums and constituting diverse relevant 'micro-publics' for them as an extension of combined fieldwork/text-making' (Marcus, 2016: 16).

But, though there were potentially similarities between a multi-sited ethnography and conceptualising an ethnography for a Geography thesis tracing the process of the artistic practices connecting artist-led groups, the thesis was exploring the artistic practices themselves as the object(s) of study. Therefore I was to conduct the research across multiple sites, rather than it necessarily being multi-sited.

[106] Marcus collaborated with artists at the World Trade Organization (WTO) as a 'second act' to his previous long-term ethnographic research project there. As an ethnographer, it allowed him to explore 'second-order observation', the notion of the observer being observed (see Rabinow, 2003; also Luhmann, 1993; 1998 for ethnographic implications). Different to conventional participant observation, Marcus could observe those observing the jointly-produced work, allowing him to note observer reactions to a work he had co-produced and thus understood well.

However, given the experimental nature of the artist-led groups I was exploring and tracing, I sought to conceptually combine some parts of the multi-sited process to my study. The artist-led groups I was working with were experimental, and – as I have already highlighted – arguably imbued both an ethnographic approach and a multi-sited one. The research was not to be multi-sited, but it did imbue some of the characteristics of being multi-sited owing to my visiting of multiple sites and encountering site-specific forms of artistic practice.

For example, as the artist groups I researched all involve experiments around science and technology, and a relationship to institutions, I sought to explore the connecting process of artistic practice between the groups' practices. These manifest at different sites. By researching different sites, I could investigate each group's practices, and create connections as my understanding of the groups and the network increased at each site.

Furthermore, at each site one's awareness of their own position at the site helps show changes across different sites, while the researcher creates complex links between these different site which involve comparisons across sites, practices, personnel, and social and cultural engagements and relationships. These therefore produce connections across different sites, with the researcher the chief architect[107] in constructing these connections as well as deciding the next site to visit (see Marcus, 1995).

For Christine Hine (2007), the complexity of these links reflects a strength of a multi-sited approach, which is its more accurate representation of lived situations. She explains:

> '…the multi-sited approach feels necessary in many circumstances as a faithful reflection of lives lived not in discrete locations, but through various forms of connection and circulation. The multi-sited imaginary is a way of capturing the need which has increasingly been expressed for forms of

[107] Though the researcher is not the sole actor doing this; the participants, for example, also shape this through their answers and participation at each site.

> ethnography which do justice to the complex patterning of contemporary life' (Hine, 2007: 656).

As Hine highlights, on the one hand, the researcher visits different sites to sample connections in their lived situations, but on the other, their lived situations are lived as much in the connections and circulation between them and others, as they are anywhere else. A multi-sited approach therefore offers a way to reconcile both of these, though my physical presence at these sites with participants would alter their lived situations in any case as their daily routines were disrupted and actions performed differently around me as the researcher.[108]

However, such a complex approach can be problematic. As Hage (2005) identifies, in hopping from site to site, the researcher inevitably takes fragments of other interactions at each site with them, blurring and mixing actors and processes from each site. For Hage, these fragments are not minor, but instead are significant personal experiences accrued by immersion at each site, implicating both the researcher and participant. The more involved the researcher becomes, the more pulled into the participant's social field (see Bourdieu, 1993) the researcher becomes, and the harder it is to extricate themselves. These experiences and relations are taken with them from that site to the next, affecting their interactions and immersion in the next site.

Once *at* said fieldwork sites, I used other ethnographic methods which could be used at different sites when tracing this network. Ethnographic methods provided me with a range of methodological tools to use, which I cover in more detail later in this chapter. Ethnography also allows for reflexivity (Morton, 2014; Ekinsmyth, 2002) and showcases rather than hides researcher participation in the research process. These were critical factors given both White and Pell were using social practice in their works and were encouraging participation in their works from everyone encountering

[108] Bliss (2015) discusses the emotional engagement actors can develop with the researcher, performing in particular ways when recounting stories, staging and circulating emotion. Though Bliss's (2015) work concerns digital storytelling workshops specifically, the act of recounting stories can inspire similar performances in participants and researchers. For further discussion of performativity, see Butler (1999).

them, including me as a researcher. I could, therefore, research White's and Pell's practices from their perspectives *and* acknowledge *my* influence on *their* practice.

I drew on recent geographical literature on ethnography to help apply these methods effectively (Davies and Dwyer, 2008; Ekinsmyth, 2002). These ethnographic methods highlighted the researcher's positioning as a 'messily feeling research participant' (Shaw et al., 2015: 214) rather than an objective witness (Vannini, 2015; Barnes, 2001), acknowledging the researchers participation in and structuring of the research process just like the researched (Crang, 2003a; England, 2001). The researcher's subjectivity is acknowledged through their feelings and positionality, something systemic throughout rather than simply a footnote obstacle to sidestep before continuing the original argument (Crang, 2003a).

This messiness of the research process (Law, 2004) reflected the assemblages that I formed when engaging across space with different sites, which were complex, and intricate (Latour, 2005). They contained several actors and materials at different sites, the relations between which were messy, overlapping, and flowing (Law, 1994). Consequently, it rendered impossible a separation between the researcher and the studied (Evans et al., 2008). For Evans et al. (2008) '[t]he act of research, […] calls forth new social groups that act on the world' (ibid, 2008: 342) by involving them in the research process. The researcher, then, becomes 'part of the fabric of the context they are researching' (Skjulstad et al., 2002: 213; Warren, 2012).

This identification of a messy research process follows recent literature identifying more understanding of implications on the researched (Davies and Dwyer, 2007; Bennett, 2002a). These literatures include studies considering emotions (Bondi, 2005a; 2005b; Browne, 2003), and the implications for researchers as people (Bennett, 2004). Across time, these implications change with the project's development while the researcher's presence waxes and wanes. To account for this fabric of the community changing – through the researcher's presence, or quotidian changes – the researcher's identity also changes as the topic, and research process, unfolds (Crang, 2003b; Bennett, 2002a).

This section completes the methodology's theoretical rationale, drawing on literature, previous engagements, and theoretical contributions to explain the tools chosen to

research my empirics. I now move on to discuss the common methods I used at each site, and the practicalities of using these at my fieldwork sites.

3.3.2. Enacting methods on-site

In this section, I now show what methods I drew on at each fieldwork site when engaging with artists for this project.

To address the connections in my ethnography, I selected other ethnographic methods, including interviews, participant observation, and field notes. In selecting ethnographic methods, I sought to use conversation and participation to explore the work of artists in this network of artist-led groups. Using conversation and participation reflected artists' use of formal and informal conversation in collaborating with other parties to build collaborative networks and institutions. I therefore used interviews and participant observation at each study site, though the other methods I used are discussed in this chapter's next sections.

Given researching White and Pell's practices was a main aim, I chose interviews to research their practices further in a one-on-one situation, gauging their facial cues, body language and aiding my understanding (Opdenakker, 2006). Interviews helped in sensitising me to differences and contradictions, enhancing the richness of my data (Bennett, 2002a). The flexibility of a semi-structured design provides a chance to build conversation around my research questions and keep the conversation on-point. Crucially, this design builds *conversation*, a two-way dialogue rather than an extraction of information (Parr and Stevenson, 2015; Valentine, 2013; Clark and Moss, 1996). Parr and Stevenson (2015)[109] are considerate of the attachment developed by researcher and researched (Bennett, 2002b) during this two-way conversational period, and the implications of a researcher on their surroundings in any ethnographic study (Katz, 2013). For my study, not only was I interviewing artists

[109] Parr and Stevenson's (2015) work outlines how interviews can build a mutual, shared understanding and experience in a meaningful exchange for both parties as they recount through using interviews for compassion in assisting with trauma (see also Shaw et al., 2015).

as part of groups and individually, I was analysing the relations between them which made my contributing stories to them interesting and an excellent rapport-builder.

In interviews, 'small stories' (Lorimer, 2003; see also Lawson, 2000) important to either party, such as how White and Pell came to acquire or produce key materials[110] in their practice(s), could also be shared to enhance conversation, consolidate rapport, or offer alternative information from personal experience. These stories' pertinence is highlighted by Davies and Dwyer (2008) who argue, along with DeSilvey (2007), for incorporating them into methods. For Davies and Dwyer, such stories can connect to a geography of 'big things' such as more complex issues on larger scales 'through their attention to the social and artistic practices, and sociotechnical arrangements' (2008: 400). Marcus (1995) alludes to this use of stories for connections. He argues:

> '[p]rocesses of remembering and forgetting produce precisely those kinds of narratives, plots, and allegories that threaten to reconfigure in often disturbing ways versions (myths, in fact) that serve state and institutional orders. In this way, such narratives and plots are a rich source of connections, associations, and suggested relationships for shaping multi-site objects of research' (Marcus, 1995: 109).

Marcus' (1995) suggestion of reconfiguring narratives considers personal connections and associations as being *personal* rather than necessarily serving state or institutional orders. Interviews, then, potentially side-stepped the kind of institutional barriers present in other methods such as archival sources (see Derrida, 1995). Aside from narratives' benefit in the research process already documented,[111] they can help recall otherwise lost information.

To help better understand potential implications on the researcher and researched, I consulted and built into my research design the ESRC Research Ethics Framework given its comprehensive coverage of a vital component of research integrity. Before

[110] For White, I was especially interested in the stories behind key objects in his *Sites of Excavation and Construction* exhibition I discuss in Chapter Five; for Pell, the objects in his CPNH each had fascinating stories I was eager to hear more about given many of their unusual backgrounds.

[111] Both Cameron (2012) and Price (2010) explain the benefit of narratives in further detail.

undertaking my empirical research, I drew up a consent form as a pamphlet for all participants which they signed to recognise their informed consent. This pamphlet stated the research's purpose, aims, how their information would be used, my contact details, and that they were happy to be referenced by name in any subsequent publications. For anonymity, they ticked a box. The pamphlet contained a tear-off strip with a signature confirming their consent. I kept the tear-off strip, them the pamphlet. All formal interviews were recorded with the interviewee's verbal or written consent depending on the interviewee's preference. Though a recording device invoked different performativities (e.g. Butler, 1999) and actions in response to being recorded, it was necessary for transcription, and was consistent for all interviews. My contact details for transcripts were made available to all participants additionally, though they were also listed on the pamphlet.

Where interviews were used with the artist-led groups, White, or Pell, I used – with consent – real names of the artists interviewed. I, like Miller (2017), did not anonymise contributions from my interview participants unless they specifically asked for it. These artists' work extends across several different digital formats and so was identifiable, while their work's coverage implies they were comfortable with their views being attributed to them. That said, each participant was asked just in case, though to an extent their contributions were more salient *because* they came from these well-known artists.

3.4. Tracing a network of artist-led groups

In this section, I shift from theorising to doing. I provide an account of the act of researching, including what I did, with whom, and when. These commenced with establishing a network of artist-led groups I would come to rely on to further explore White's and Pell's works. This is the first part of this section. I then move on to discuss the research process I conducted with Neal White in the second part, and with Richard Pell in the third part.

3.4.1. Accessing a network as a researcher

I commenced with the exciting task of tracing an unfolding network with several different people, institutions, and practices. I sought to contextualise White and Pell's work and practices, which meant scoping the network they were a part of. But this is not the whole story, as the nature of research means a network can never be fully known from the start.[112] They have to be produced. Networks make starting points for investigations difficult because the researcher must somehow investigate it from outside to inside, settling on an entry point from which to explore.

I started scoping this network, unrealised at the time, back in 2011 with my then MA supervisor, Professor Deborah Dixon at Aberystwyth University. I was particularly interested in her work on the emerging area of Bioart in Geography, work which built on her residency at SymbioticA at the University of Western Australia in 2008. Part-way through my MA in a workshop organised by Dixon, artist Nelly Ben Hayoun visited Aberystwyth University in early 2012, and awoke my sensibility to a new perspective on experiments. Once funded for my Ph.D., this became my entry point. As connections were explored and developed further, I put together two mind maps which helped draw out relations, at this stage simply seeking to find out how these relations were engaging with one another.

[112] Macdonald-Munro (2004) makes this point in discussing research, arguing research, by definition, has to be unknown because it is something creating new knowledge which, as yet, hasn't come into being yet.

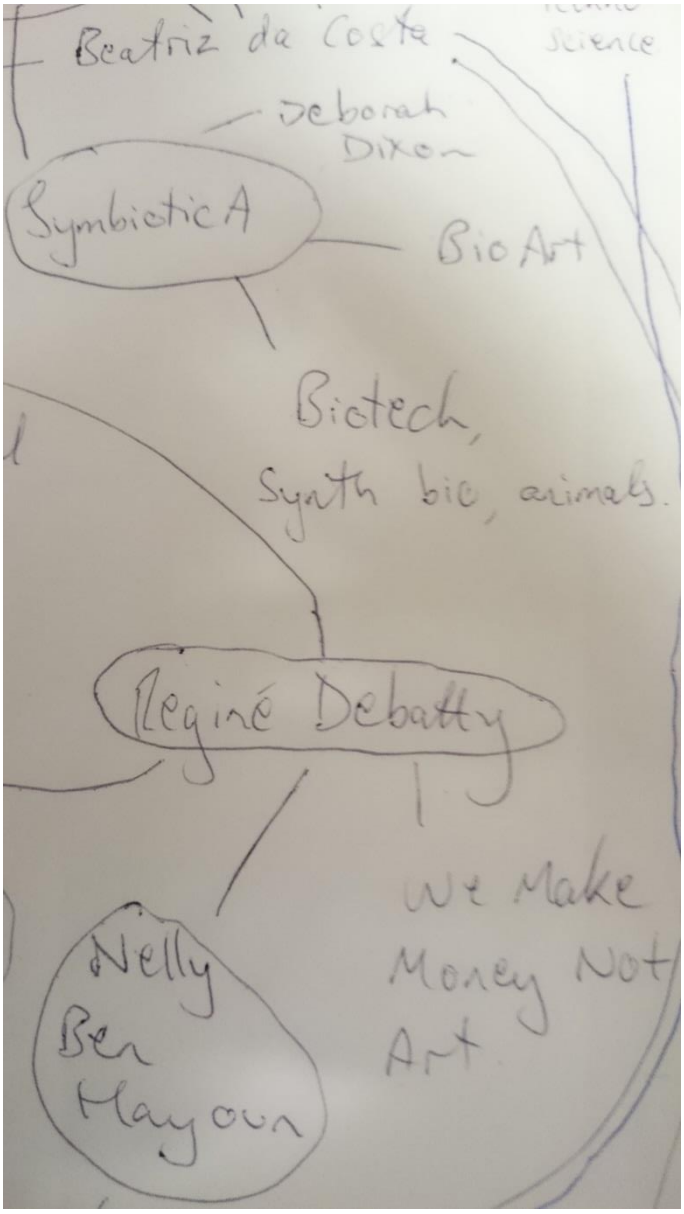

Figure 2 – Starting a map[113]

As I explored these relations further, my primary Ph.D. supervisor, the geographer Gail Davies introduced me to White's and Pell's works. It emerged she had a role in this network too, discussing White's work in a session Dixon had organised at the 2012's AAG which connected her with Dixon, and Geography with White and with Pell. The pre-existing connections Davies had with White and Pell I found extremely helpful in securing access with White and Pell through tentative introductions, which I then took over from. I developed connections progressively, providing exit options for

[113] Source: author's photograph.

all parties available all throughout the research process should any pre-existing connection have made any of them feel uncomfortable.

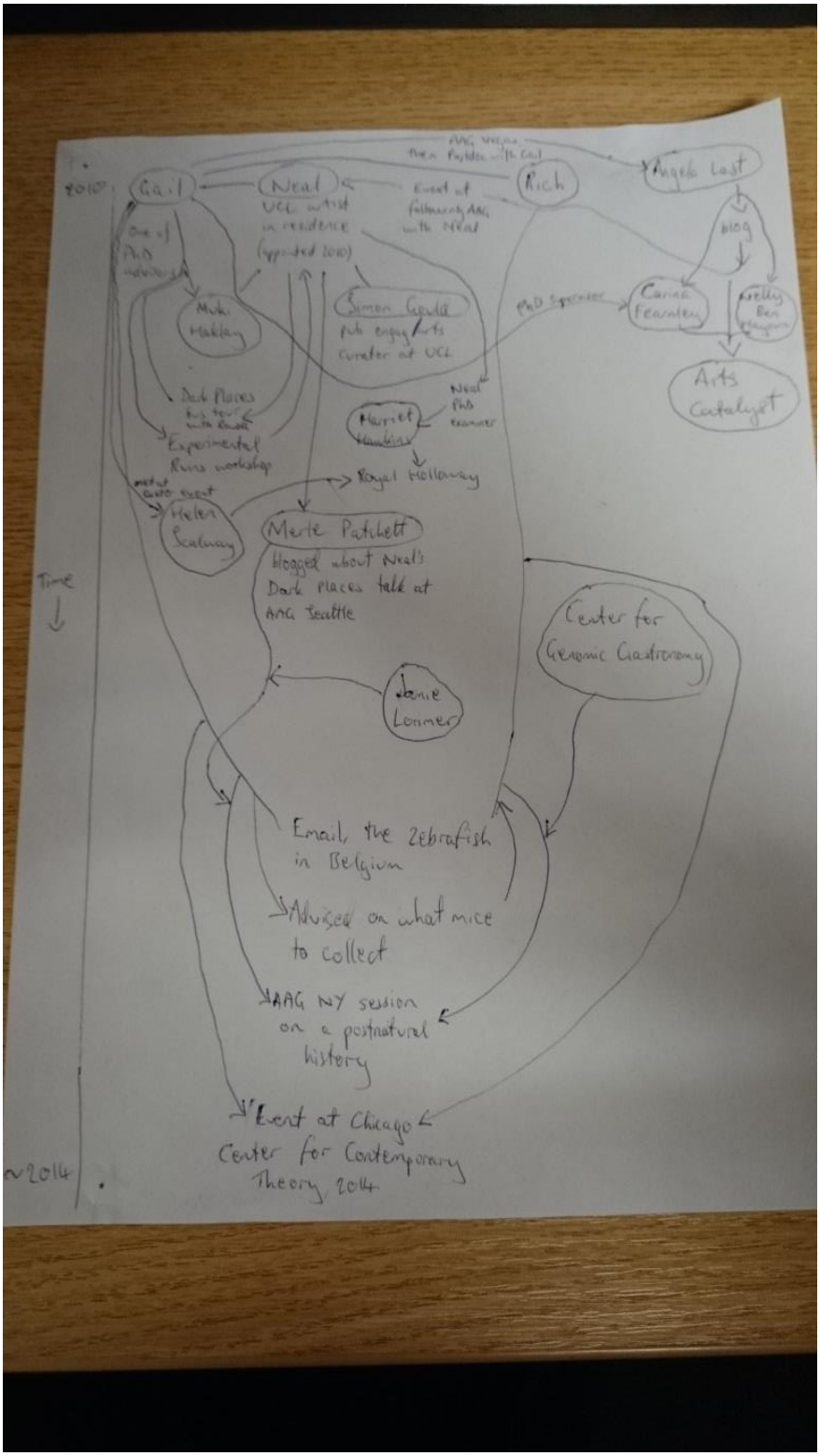

Figure 3 – Mapping Geography connections[114]

[114] Source: author's photograph.

At this point, however, I knew only of White and Pell, and that Davies was the key link between them and Geography (see above). Her links involving them were predominantly geographical and involved other geographers. But she was also a key link between White and Pell. She had worked with each of them, and they had only once been involved in each other's work; Pell writing a piece in White's Office of Experiments' project *The Redactor*. As I developed my connections with them, I sought to understand their work by working from *The Redactor* backwards. What were the commonalities? *The Redactor* was an OOE publication, for whom Pell was their 'nature correspondent', which was concerned with institutional power in redaction shown in different ways. It seemed institutions were linking them somehow, and there were unfamiliar names in the publication.

I researched these unfamiliar names along with White's and Pell's work online and using secondary sources, the results pointing me towards key names. Often these names were individual artists, sometimes groups, organisations, institutions, or collectives, but they all involved or connected to artists. White and Pell, then, began acting as gatekeepers for me to explore further connections from. Following this 'process' in a way akin to a multi-sited ethnography (Marcus, 1995; 1998), I attempted to map these key names out like Dixon had done with art-science collaborations at SymbioticA, tracing connections between them:

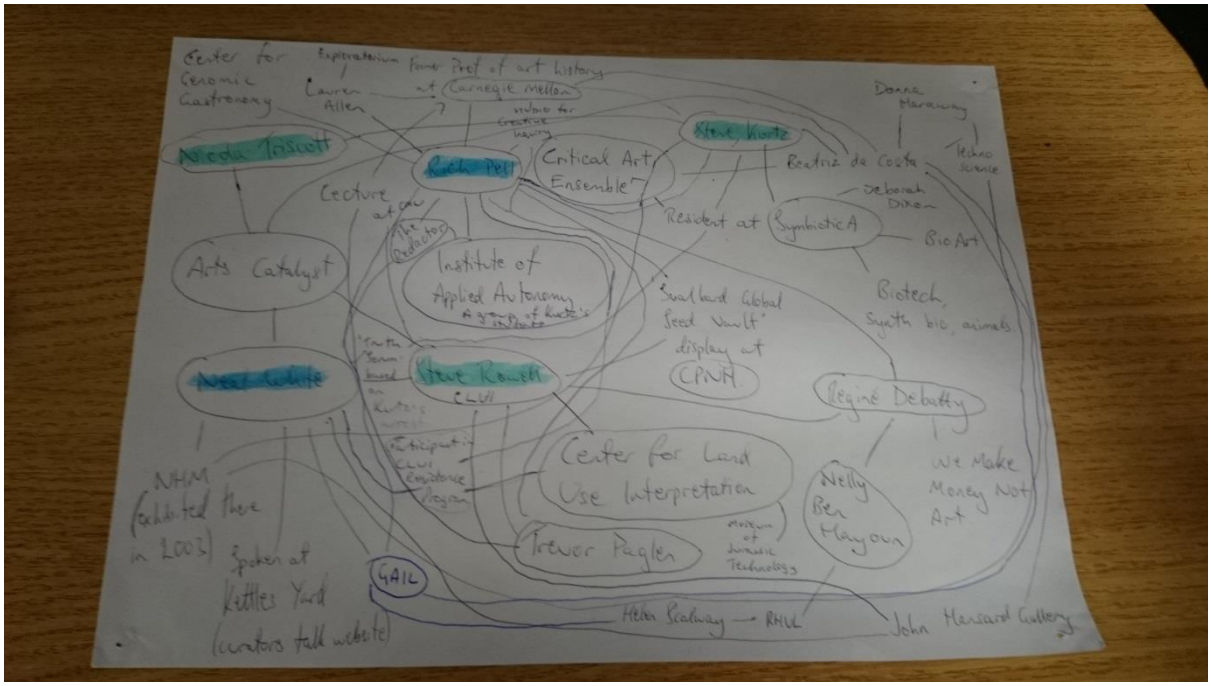

Figure 4 – So this connects to this...[115]

As groups' emerged, I saw a wider picture of the links within this network of artist-led groups working in science and technology. And these links included my MA connections. This network's people and groups were not just operating in the same area, but had personal connections with one another and involved institutions. And these connections extended out into several other networks traversing sectors and industries. These artist-led groups, many of which were expressed *as* institutions, also had complex relationships with practices, objects and entities. There were complex relations between these too, but to prevent this project's focus becoming stretched and too expansive, they are simplified. However, as my knowledge of network expanded, the context of White's and Pell's works became more apparent. Wherever an artist-led institution was, either White or Pell – or sometimes both – had (in/)direct connections to them. Quite simply, White and Pell sat at the confluence of many of these connections which I was interested in exploring for their relationship to other institutions.

However, before I could start to fully research this network, I first needed access to key people. As Williams (2012) states, access is not a 'one-time hurdle' (2012: 124) to be overcome. It is instead 'a process that is performatively negotiated each day

[115] Source: author's photograph.

whilst in the field' (2012: 124). The researcher must understand the complexity of access and maintaining trust. I attempted to negotiate access through regular contact with key personnel, offering help with projects where possible, and offering my labour in exchange for allowing me to conduct my research.

To secure access, I contacted what I identified as key personnel in this network.[116] Using White and Pell as known acquaintances – with their permission – in my introductory contact messages, some contacts responded, some didn't. For those willing to have a conversation, I arranged a Skype meeting[117] with them to build trust and have preliminary discussions. If they accepted me as an acquaintance they could then hopefully act as gatekeepers in developing further contacts.

Skype discussions, however, can be less comfortable because individuals are less familiar with how to perform in such situations, according to Adams-Hutcheson and Longhurst (2016). For Longhurst et al. (2008), this discomfort stems from having their bodies filtered through screens as researchers are denied the opportunity to use their bodies 'as instruments of research' (Longhurst et al., 2008). Reducing bodily experiences[118] in this technology limits the bonding rhythms and quotidian physical practices between researcher and participant, such as offering a cup of tea, or sharing an intimate personal space like the home (Adams-Hutcheson and Longhurst, 2016). Though these concerns were valid, international locations often made Skype the only feasible option.

Once I had contacted key personnel and spoken to those willing, I re-visited the practices of key artist-led groups whose names kept emerging, as well as White and Pell. With so many groups and names in this network, I established the key elements of practice these groups and White and Pell had in common, which was a relationship to science and technology, either as or through, institutions. White's and Pell's contribution in geographical conversations I outlined in Chapter One ensured

[116] This was a problematic distinction, and I often leaned on White and Pell early on for confirmation of particular names and groups.

[117] Using Skype altered the site of fieldwork, though I was still able to attain fragments of engagement from each engagement even if only over a virtual rather than physical basing.

[118] Longhurst (2008) sees bodily experiences as instrumental in the research process.

they would remain the key actors in this network which I worked outwards from. I therefore returned to White's and Pell's interests, lineages and personal references emerging from secondary and internet-based research, which I traced and fleshed out once connections were mapped.[119] Like Hine (2007) experienced when preliminary scoping her own multi-sited ethnography, the '[l]andscapes of interconnected institutions and initiatives emerged on the internet, providing a territory of their own to navigate with ethnographic sensibilities' (Hine, 2007: 666). At this point, I was an observer of the network unfolding before me, tracing the folds and linkages between names, groups, and ideas.

Furthermore, at this juncture, I also had to ascertain the network's boundaries and confirm which groups would become the most useful to the thesis. I undertook several days out with different artist groups, and attempted to trace general themes through their projects to draw terminating lines, though these were inevitably arbitrary.

Figure 5 – Unusual fieldwork locations included the River Thames Estuary, Southend-on-sea with CAE[120]

[119] I noticed researching these linkages from secondary sources was much more impersonal and slower than exploring from primary sources. I therefore sought interviews with key personnel where possible – often over Skype due to location – and drew on interview material from White and Pell to ascertain the network's scope.

[120] Source: author's photograph.

As Perec (1999) discovered when attempting classification, simplifying in the hope of marking out distinctions begins a messy, incomplete process of constant clarification and iteration riddled with errors and mis-identification which he describes as ‘hardly any more effective than the original anarchy’ (Perec, 1999: 196). Eventually I settled on five key groups, each of which White and/or Pell had referred to previously as drawing influence from, and who were engaging with or through institutions to open conversation around science and technology.

Once I had identified these five groups, I needed access to them. The groups and their associated details, including my access point to them, are summarised on the next page:

Group name	Acronym	Location	Dates active	Access point
Artist Placement Group (UK)	APG	London, UK	1966-89 (re-launched as (O + I) from 1989-2009)	Neal White – mentee of APG member John Latham and former Director of O + I
Arts Catalyst (UK)	-	London, UK	1994-present	Neal White – receiver of AC-sourced funding crucial to OOE projects
Critical Art Ensemble (USA)	CAE	Buffalo, NY, USA and across the USA	1987-present	Richard Pell – former student and mentee of Steve Kurtz, CAE's co-founder. Also Neal White was a personal friend of Kurtz's
Museum of Jurassic Technology (USA)	MJT	Culver City, CA, USA	1988-present	Richard Pell – personal friend of MJT co-founder David Wilson
Center for Land Use Interpretation (USA)	CLUI	Culver City, CA, USA	1994-present	Richard Pell and Neal White both undertook CLUI's residency programme at Wendover, Utah

Table 1 – Table summarising artist-led groups' information

As the table shows, these groups were all based in either the UK or the US, reflecting White's basing in the UK and Pell's in the US. These groups are explored in Chapter Four, while White and Pell in particular were the key people of focus in

Chapters Five and Six given they represented the most recent parallel institutions at the confluence of these key groups with key practices relating to science and technology and excellent access.

With many of the individuals in this network being a part of academia helped to an extent because it meant they were accustomed to particular practices and protocols associated with the academy. While I realised the limitations and exclusivity of this situation, this was a key part of their practices; their institutional ties to academic institutions often gave them access and financial resources to key places they might not otherwise have secured. Being positioned in academia gave them a particular kind of platform to speak from and be invited into particular conversations which can sometimes be harder without an institution behind them.

I sought to follow ideas rather than requiring they emanate from particular groups of people. This was to keep in line with the processes and artistic practices I was seeking to follow. However, I recognise the artists mainly drawn on in this thesis operate from a position of privilege on more than one level, being Anglophone groups of predominantly college or university-educated white, male, middle-class individuals with ties to key institutions. I also acknowledge this is problematic and part of a wider complex set of issues relating to gender, ethnicity, class and social status which are currently being worked through in Western society. As all the artists I worked with in the thesis pointed out, they integrate ideas and conversations from all range of people as part of their practice. White and Pell in particular always credit their work as emanating from the inputs of other people in their conceptualisation of ideas, and these manifest in their final works.

3.4.2. Researching a network as a participant

While scoping this network, White approached me to collaborate with him and his long-term collaborator, Antony Hudek, for an upcoming project titled the *Centre of Centres* (CoC). The *CoC* was independent of the OOE, and was White's *personal*

practice.[121] In producing a project with White, I hoped to improve my understandings of his work which might apply to my research. The *CoC*'s goal was to map a largely unstudied area of collective cultural production, by recording, studying, and making public material and information generated by artists' centres, groups, institutions, and other forms of association. At this stage, the project was embryonic and required researching current and defunct artist-led groups. As the project evolved however, we introduced new criteria to refine the *CoC*'s scope. Consequently, I needed to research new areas, each coming with secondary sources to discover and consult.

For this role, I spent one month conducting remote research-based fieldwork during summer 2015 liaising with White as part of a collaborative project. However as Hester Parr (2007) discovered when discussing editing with collaborators, often it is *during* collaboration where meanings and understandings about research topics become apparent. With the *CoC* I was jointly responsible for *creating* the concept rather than studying it, my research underpinning the project's eventual form. Precisely *because* my task was research, it morphed, sprawled, and changed throughout, as did the brief and requirements.

Here, the complex reality of collaborating with non-social scientists and non-academics came to be. One way this was expressed was through constructing a research problem. As White remarked, artistic practice reverses social science's tendency to research once research questions are in place. In artistic practice, research questions instead emerge *during* the research process, inviting reflection on the research to shape the questions further. Consequently, *directing* research is difficult because research areas emerge from visitor interpretation, especially in White's social practice, which are typically *after* undertaking initial research. Co-producing the artwork, then, for me on the *CoC* and for Marcus (2016), represented exploring a set of ideas by constructing a forum for their discussion. For the social scientist, this was an invaluable extension of fieldwork, being able to hear views on the artwork from those experiencing the social practice piece.

[121] Consequently, background knowledge I'd accumulated about the OOE was only partially relevant here, and required new understandings and contextual knowledge about White in collaborating with Hudek.

Part of the *CoC*'s challenge related to working with artists. Much literature has documented this[122] as covered in Chapter Two, and, whilst not type-casting particular behaviours as necessarily artists' behaviour, differences presented other challenges. In producing a diverse project like the *CoC* with an appeal to those beyond art, the practices made pitching commentary difficult because White could vary the project at any point, and so could the participants. Working with artists also meant a reflection on what it meant to be a social science researcher and the implications of artistic practice not just for their projects, but for mine too.

The other part of *CoC*'s challenge to me involved the project rather than necessarily working with artists and non-academics. The *CoC* was in an unknown conceptual space to me, with artist-led groups I hadn't encountered, and fuzzy boundaries to its brief. To an extent, all research starts as an unknown space (MacDonald-Munro, 2004), and this was an unknown space for me. I needed to synthesise significant details of these artist-led groups to connect knowledge of one to another, without knowing who/what would become important, if at all. Upon discovering two useful groups, there was no guarantee they were connected for the project. If so, could I *create* a connection between the two groups? Or was I just *discovering* a pre-existing connection? Such challenges were an example of what Heidegger discusses about methodology adapting to itself during the research process (1977b). He writes of methodology:

> 'More and more the methodology adapts itself to the possibilities of procedure opened up through itself. This having-to-adapt-itself to its own results as the ways and means of an advancing methodology is the essence of research's character as ongoing activity' (1977b: 124).

For Heidegger, then, this exercise struck to the core of research, as an ongoing activity. Fundamentally, ascertaining the difference between *discovering* pre-existing links between groups and *creating* links proved problematic, despite the significant difference between the two. And these links needed to be agreed on by White and/or Hudek as part of the collaboration. But the collaboration marked a critical point in going from observer to an active participant in this network's creation. I was no

[122] Two examples being Foster and Lorimer (2007), and Marcus (2016).

longer studying it, but co-producing this network, linking together other groups omitted when researching for my own project. I was co-producing something I was an active linkage in, acting as another link in this already complex network.

My role in the *CoC* also highlighted four data collection and researching issues embodying research's partial nature. First, there were questions around compiling data; what data from which sources, for instance. Second, the representation of said researched data; how it is represented, and what research frameworks are being applied to it. Third, the practicalities of secondary research; secondary research was time-consuming, and no contacts of mine – barring White – knew the research area. Fourth, the project's embryonic phase revealed its messy production process, from the conceptual to the practical, financial, and logistical. These were angles which I negotiated throughout the process, liaising regularly with White and Hudek to ensure we were all working together on the collaborative project.

Unfortunately, shortly after this researching phase, the *CoC* was suspended pending further funding. Some *CoC* material was instead directed into the collaborative Neal White, Tina O'Connell and Objectif Exhibitions project *9 Events*. An output of *9 Events* was the exhibition *Sites of Excavation and Construction* (SEC) which launched in mid-November 2015, which I discuss in further detail later.

In researching – and to an extent, co-producing – this network of artist-led groups, I spent time in several different towns and cities across the UK, US, and Europe – including Exeter, Leigh-on-Sea, London, Buffalo, Los Angeles, Pittsburgh, and Antwerp – tracing a process built on artist-led engagements with contemporary science and technology. Researching this number of sites gave me first-hand experience of Hage's (2005) concern of carrying emotional fragments from each site to the next. But not only did I feel carrying these fragments enriched my data – by using those fragments to develop a better understanding of the network – I also found that exploring several different sites helped explore how artists build collaborative networks and institutions through conversation and participation.

3.4.3. Researching (with) Neal White

In researching with Neal White at the OOE, I drew on several methods which I start this section by explaining further. However, I also contributed to an upcoming project of his as part of my research. This offered a practical dimension to learn through doing, giving me an opportunity to frame 'art as a practice, something which geographers and audiences actively and physically 'do'' (Miller, 2017: 246; see also Hawkins, 2015 and Warren, 2012).

Access when working with White was very generous. Where I sought access to physical sites,[123] White not only secured access but secured me access to his collaborator for that project Antony Hudek.[124] White also secured me access to digital resources, such as art magazines, niche artist groups and organisations websites, and other resources otherwise unattainable.

However, White's practice meant there was never one central hub to visit for fieldwork. Predominantly I liaised with White online because of changing research schedules, unexpected events, and unfortunate timing. I conducted interviews with White and four other practitioners who knew of him, the majority of these over Skype. These were semi-structured interviews, like all other interviews in the study. I interviewed White five times, each over Skype, and typically lasting one to two hours. When selecting interview questions, I drew on idea lineages and personal influences, heeding Cross et al.'s (2002) assertion of *what* people know often being heavily derived from *who* they know. The first interview was conducted in December 2014 and the last in September 2016, with an extended period of designated fieldwork with White from July to November 2015. I sought a long time span of interaction, for two reasons. Firstly, I hoped it would provide familiarity between White and I, and secondly that I could track how White implemented his practice through different projects emerging over this period.

However, I also spent much informal time with White, such as at three presentations he gave at workshops and conferences, and for his *SEC* exhibition in Antwerp.

[123] An example of this was at Objectif Exhibitions in Antwerp for *SEC* which I discuss in Chapter Five.

[124] Hudek was especially useful because of his strong knowledge of and experience with White and APG, who were very influential on White.

Consequently, distinguishing between general chat and a designated interview was difficult, though I noted both in my field notebook. I also interacted with other professional affiliates of White. Interactions with these affiliates spanned interviews and informal chats in different locations, having conversations with seven associates of White, predominantly done in person. I supplemented these interviews and conversations with participant observation and a research-based constituent at *CoC*.

Participant observation was notably during *SEC* production in Antwerp where I assisted in its production preceding its November 2015 launch in Antwerp. *SEC* was hosted by Hudek at Objectif Exhibitions in Antwerp, and I was briefed to help set it up on-site. I spent five days there, helping set up and display the installations alongside White, collaborator Tina O'Connell, and Objectif's Director and *SEC*'s commissioner, Antony Hudek. Assisting in day-to-day practices I hoped would provide insights into the tacit knowledges of developing a project such as the *SEC*. My role in assisting the production of *SEC* covered any task helpful in preparation of its launch. These were often simple tasks which helped me understand the 'backstage' elements usually omitted from the polished final output.[125] During the tasks, I sought conversation with whoever else was helping me – a group of seven or so involved in *SEC*'s production – providing it did not distract them or me from our tasks. On launch day, I chatted to visitors, answering their questions and asking my own, and joined them for dinner after the drinks reception, though writing up entries in my field notebook on days like these late at night was occasionally challenging to piece together. These informal scenarios and conversations were critical in understanding the dynamics not just of *SEC*, but how White implements his practice.

When assisting with *SEC*'s exhibition launch, I aimed to ask questions to visitors, without detracting from questions they had generated or attempting to influence their framing of the space. Such actions came with ethical considerations around three

[125] These behind-the-scenes elements share resemblance with Star's (1999) work on infrastructure, which she defines as "the truly backstage elements of work practice" (Star, 1999: 380). Infrastructure is essential, runs behind-the-scenes, and is only noticed when it malfunctions, being "sunk into and inside of other structures, social arrangements and technologies" (1999: 381). It provides the necessary 'backstage' tasks to run something which relies on it. For Star and Ruhleder (1996), infrastructure has a "relational property" (1996: 113), interpreted according to individuals' personal perceptions rather than something with intrinsic, inherent infrastructural properties or criteria.

areas. Firstly, informed consent (Ritchie et al., 2003) which I sought to counter by putting up posters at positions on pre-agreed walls[126] informing visitors of my presence and research, and asking any objections to be made verbally. Secondly, the researcher/participant relationship (Orb et al., 2000; Ramos, 1989) which I attempted to keep casual where possible through small talk and brief conversations. And thirdly, the customs, routines, and inner workings involved in *SEC*, which I was mindful of and respected, given White's generous and extensive access.

To further understand White's philosophy, I also researched details of previous projects or underlying philosophies – such as those of White's main influence John Latham – which I could follow up in conversations, interviews, or emails. Being online also allowed me to read further around these areas with ease, reading reviews from project attendants, and consulting book chapters and journal articles about White and the OOE.

3.4.4. Researching (with) Richard Pell

Researching with Pell was very different to White. Given the CPNH's physical location in Pittsburgh, PA, a different approach was required for Pell to White, so I elected to visit him at the heart of his project to better understand the space and exhibits. In this section, I discuss the process of researching with Richard Pell at his Center for PostNatural History in Pittsburgh, PA, an institution only opened three years before I arrived, and the only one in the world housing exclusively postnatural organisms according to Pell.

Choosing to visit the CPNH allowed me to regularly converse with Pell. Aiming to engage with the tacit knowledges in the quotidian running of an institution, I sought to get beyond the discursive set, designated conversational event often characterising ethnographic research (Latham, 2003), such as an interview. I sought to do this by blending methods designed around familiarity such as participant observation over an extended period of time, hoping each interaction would become more familiar for both Pell and I. Evans and Collins (2007) argue this aids in

[126] The walls were pre-agreed so as to minimise impact on the space's interpretation.

generating knowledge about the research area, stating that '…knowledge is acquired by socialisation, so expertise is acquired through a prolonged period of interaction with relevant communities and is revealed through the quality of those interactions' (Evans and Collins, 2007: 620). In a similar vein as Evans and Collins (2007), I attempted to become immersed in Pell's world to better understand his practice and the everyday processes at the CPNH.

I secured funding for six weeks of research between April and May 2015,[127] but before I could depart, I had to consider the complex legal and federal complications around genetically-altered organisms in the US. While the CPNH only had one living genetically modified organism, I still had to seek out the appropriate laws and understand how my research might be implicated, such as Section 511.1 in Title 21 of the United States' Code of Federal Regulations. These and the relevant criteria I was assured had been met by the CPNH's Director, Richard Pell, and my research – fortunately – was not directly contravening any of the regulations, allowing me to proceed.

Pell gave me 24 hour access to the CPNH alongside a set of keys, and daytime access to CPNH archives located upstairs in his home. Access to such a personal space was very trusting and hugely appreciated, giving flexibility to manage my time between different sites. He also provided me with requested resources where possible, including the venue for my concluding lecture, and advertising my research through official CPNH media streams.

Once in Pittsburgh, I conducted four designated semi-structured interviews with Pell, typically lasting one to two hours. They were in person, either in the CPNH or in his home nearby where CPNH archives were stored to be able to physically show CPNH examples in questions and answers. Whilst we had also liaised over Skype and email preceding my Pittsburgh visit, working at the CPNH for six weeks meant I liaised with Pell informally almost daily. Discussions invariably contained useful information, though differentiating between noteworthy and 'off-the-record' remarks

[127] This funding was extremely generously granted through Pell. He produced a Visiting Researcher post in Pittsburgh for me, which I won funding for from the Studio of Creative Inquiry (SCI) and the School of Art at Carnegie Mellon University (CMU), where Pell is a Professor. I also won funding from the University of Exeter.

was not always clear. Off-the-record remarks also inescapably sub-consciously informed my views for research material; once I was aware of them, I could not become unaware.

In addition, I also interviewed six other affiliates of the CPNH, whilst I informally chatted frequently and assisted in producing the PostNatural Organism of the Month (PNOOTM) exhibit with another of them. These affiliates had had direct, behind-the-scenes experience of the CPNH's running. Given the CPNH is a small organisation on a shoestring budget and intentionally does not have many affiliates, I sought to garner views from this limited pool to assess interpretations of people with more CPNH knowledge than visitors, besides Pell. They occupied a position somewhere between visitors who see the polished façade, and Pell who manually constructed the institution's nuts and bolts. I was fortunate to be hosted by Pell's friends who I chatted to frequently and informally, and who provided countless insights about Pell's practice. I also gathered views from Pell's personal mentor, Steve Kurtz of Critical Art Ensemble (CAE).

I volunteered my labour at the CPNH, working on-site during opening hours which required a fast-tracked briefing on the postnatural as a concept; what it meant, how far it extended, and how it was being displayed in the CPNH. The CPNH drew its novelty partly from the postnatural concept, but also from its objects' stories which I had to learn so queries from visitors about them could be answered. I also helped out with any odd jobs Pell requested. These included using Google Earth to identify Concentrated Animal Feeding Operations (CAFOs), writing Wikipedia entries for the CPNH and 'Postnaturalism',[128] aiding in research for the PNOOTM, and using CPNH archives to enhance understanding of 'Postnaturalism'. I also assisted the CPNH in hosting a public event by giving a lecture about my research. These helped scope the conceptual breadth and application alongside the practicalities of a running a space like the CPNH.

By combining these approaches, I intended to benefit from an extended understanding drawn from 'doing', from bodily mobility which 'surpasses our capacity to explain […] through pages of verbal description' (Adey, 2010: 142; see also

[128] 'Postnaturalism' is a term Pell re-coined in naming the CPNH.

Longhurst et al., 2008). The researcher's body in the research process produces a necessarily unavoidable situation implicating corporeal knowledges and experiences in research spaces and practices (Morton, 2014; McMorran, 2012; Longhurst et al., 2008). These situations, for Crang (2003a), should be embraced as part of a more felt, 'touched, and embodied constitution of knowledge' (2003: 501). This is especially important because despite attempts to question the research process such as by Ashmore (1989) and others (see Butz, 2001; Cook, 2001), being corporeally present remains a validator for qualitative fieldwork (Crang, 2003a).

For Billo and Mountz (2016), ethnographic methods are about more than corporeality, or studying artefacts, people, or ideas. They can instead uncover other relations, key actors, and operations in institutions, such as at the CPNH or the OOE. Billo and Mountz (2016) argue:

> 'This need to observe is crucial to the workings of institutions. While interviews lend insight into actors and operations of institution, participant observation, fieldnotes, and detailed archival study enable spatial analysis and associated insights into power relations. […] The ethnographer unravels patterns of behaviour and interaction, categories of identification, modes of management, exercises in power and interpretation in everyday life' (Billo and Mountz, 2016: 204).

For Billo and Mountz, the inner workings of institutions manifest in behaviour, interaction, power relations, and interpretation which can only be researched through direct experience spent with these institutions. While the CPNH is a very small institution with predominantly two people working there day-to-day, it still represents a manifestation of power relations and interpretation, though arguably more through its role as an artwork. Nonetheless, given how crucial the physical space of the CPNH is to it, I saw it as an opportunity to enact on-site theory, for it to be *done* rather than being *learnt* (Crang, 2003a; Shurmer-Smith, 2002).[129]

[129] The difficulty of expressing such experiential knowledges and experiences has led geographers to alternative methods. These range from cartoon strip sketches (Katz, 2013) and artistic practices (Davies and Dwyer, 2008) to artistic practice itself as a research method (Mareis et al., 2011).

Further, I used my physical basing at the CPNH for two key engagements with visitors. Firstly, I liaised with CPNH visitors during opening hours to get a better understanding of the institution. Being a niche museum with relatively small influence meant visitor numbers fluctuated enormously, from as low as single figures to over 300. Consequently, to ensure sufficient data collection, I negotiated with Pell for increased opening hours, which were communicated via the CPNH's digital presence.[130] I used these visitor discussions and a focus group I ran with visitors to generate further understanding about the city. These discussions were very useful for this purpose, though they had limited utility in terms of original research findings.

Secondly, I supplemented my verbal exchanges with visitors with participant observation to enhance my understanding of where Pell's practice's derived from. Participant observation in this context meant helping out with the day-to-day practices for several days per week including the opening hours on Sundays. Here, my goal was to utilise the site's enchantment potential (Bennett, 2001). A site like the CPNH[131] offered much potential for enchantment, though Bennett argues this is likely in any fieldwork setting. 'You notice new colours,' she says, 'discern details previously ignored, hear extraordinary sounds, as familiar landscapes of sense sharpen and intensify' (Bennett, 2001: 5), heightening awareness of surroundings otherwise unnoticed in quotidian spaces.

While participant observation extends beyond the study site to truly be immersed in surroundings (see Bennett, 2002a), I sought to use time as effectively as possible to develop understanding of the CPNH, but also write regular field diary entries.[132] Consequently, I also aided in the CPNH's opening hours during May 2015's *Unblurred*, Pittsburgh's artist space/gallery walk on the first Friday each month, and I talked to other Pittsburgh residents who either knew or knew *of* Pell, but were not directly involved at the CPNH. These included undergraduate art students at Carnegie Mellon University and its Studio for Creative Inquiry, artists at the Open

[130] To ensure attendance at these hours, I also part-subsidised Pell for free t-shirts, which would be given to the first 15 attendants.

[131] The CPNH styled part styled itself on a Wünderkammer, or cabinet of curiosity, which often were seen as enchanting places. I discuss this further in Chapter Six.

[132] All contributions from all participants – involved in the network, with White, and with Pell – and any associated transcripts were confidentially stored in line with the Data Protection Act (1998).

Engagement 2015 art conference hosted in Pittsburgh in April, and other acquaintances of Pell's dispersed around the city such as in the Carnegie museums. Being informal conversations, I noted them rather than recorded them and followed the flow of general conversation rather than pre-scribed questions.[133]

Much like at *SEC*'s exhibition launch, I was mindful the questions I asked during CPNH opening hours did not conflict with the image Pell had so carefully curated. While chatting with visitors, ethical issues around informed consent (Ritchie et al., 2003) were considered by informing visitors of my research, like at the *SEC* launch. I also ensured my actions respected the inner dynamics of the CPNH and its raison d'être which Pell had patiently and kindly entrusted me with.

At each site for each empirical encounter, I used three main methods to record data. They were a Dictaphone, my field notes, and/or photographs. In particular, my field notes were critical in documenting my thoughts, feelings, and ideas of the environment around me. I dedicated time each lunchtime and evening to write up my day's notes, connecting ideas together and reflecting on the day.[134] However, using a field notebook was as much a curatorial challenge as a logistical one (Crang, 2003b). Questions abound over what 'type' of data 'should' be recorded, the transition from general feelings and thoughts to becoming data validated through the simple act of inscribing a notebook page. Cindi Katz (2013) mentions encountering similar difficulties in differentiating between the thoughts and notes deemed research-worthy and, in particular, those '…constituted as marginal, imagined as private musings, anecdotes, mere 'stories' told over dinner but never part of the formal narrative' (2013: 762).

Balancing what to include was critical to ensure key details were not lost amongst a swathe of data, data too plentiful to draw results or build arguments from. Field

[133] Unfortunately, photographs showing much of my fieldwork fell victim to technology, ironically while attempting to be backed up, which limited the data I could analyse. Five weeks' worth of photographs of displays from the CPNH, from first Friday, sites across Pittsburgh, Buffalo (location of Steve Kurtz's interview), and an invited talk of Pell's at CMU were all lost during a technology malfunction. I attempted to re-take as many photos as possible, though these were predominantly CPNH-based as increased opening hours and interviews had restricted my movements for the final week of fieldwork.

[134] I also used a Dictaphone to record thoughts throughout the day in a bid to save time writing, with the final idea being documented in the notebook and the recordings listened to when travelling.

notes, however, are ‘necessarily partial, situated, embodied and unstable’ (Morton, 2014: 77; see also Emerson et al., 2011), yet formed the spine of my empirics, acknowledging the limitations of a subjective worldview outlined in Strathern’s (2004) ‘partial connections’. However, these fieldwork situations were very useful in gathering empirical material which I used to help better understand the artistic practices I was studying, and my field materials were crucial to recording my thoughts at the time in an accessible and relatable way I could return to later.

3.5. Data analysis

In this section, I turn to consider how I analysed my data. This involved several considerations, such as what – for me – constituted ‘data’, how this was organised, made sense of, and why some data was deemed more important than others.

In analysing data, I first chronicled all my data. I had accumulated much, but I was unsure of its value. Pamphlets of local Pittsburgh exhibitions, artists, and displays at the Carnegie Museum of Natural History, for example, were interesting, but I couldn’t ascertain how *useful* they were. I needed to know data from my participants first to determine their use, but to do that required an understanding of the participants’ wider contexts, of which these pamphlets were a part. It was a hermeneutic circle (Heidegger, in Fisher, 2003; also Willig, 2014); the unit was needed to understand the whole, but the whole influenced the unit.

I elected to transcribe all interviews for future reference. I transcribed interviews as quickly after they happened as possible, while my memory was fresh (Crang, 2005b). The transcribing process aided in discerning and sifting data. Primarily, it helped me make sense of my data and connect ideas together emerging from the interviews. I could also scan all my secondary materials during key parts of conversations to contextualise them and I could look up any unfamiliar key terms, places, institutions, or people to add further context. I accumulated subject knowledge and opinions gathered from each participant and interaction, and these knowledges and opinions then shaped my engagement with the next interview transcript (see Hage, 2005). I also added notes to transcripts to involve tone of voice,

hesitations, and emphasis on specific words to help convey meaning beyond just the text (Silverman, 2001).

When analysing data, the different methods used meant I could not analyse all data in the same way. I employed the same methodological approach to data analysis however, following other geographers' analysis of qualitative methods (see Morton, 2014; Crang, 2005a; 2005b) which tended to revolve around coding. Crang (2005b) notes all codes are project- and researcher-specific, making them – to an extent – creative (see Bailey et al., 1999). Codes need to be malleable to a degree depending on the project. I therefore used a three-step coding process, to identify links, themes, and people pertinent to following the process of engaging with different facets of contemporary science and technology. Coding can, however, become difficult to implement for analysing photographs and other non-textual data. That said, given the limited number of photos I had, I felt a refined three-step process such as coding was not necessary for them in this instance.

Furthermore, as DeSilvey (2007) notes, classification becomes implicated in ordering data, and the longer I spent in the research process, the more problematic it became distinguishing between the useful and less useful, and under what code something sat. Partly this was because as the research process unfolds, more themes and complexities emerge which belie these categories (Perec, 1999), and partly the interpretation data changes with understandings of the research process and data over time.

Nonetheless, I proceeded with coding to organise my data. The first step was open coding which involved loosely grouping words, sentences, and paragraphs together expressing ideas, thoughts, or sentiments which can be collated under a term (see Khandkar, n.d.). This was especially difficult when coding field diary entries, particularly from the CPNH, because conversations regularly developed towards themes that ended up spanning two or more codes, or jumping back to conversations earlier in the day. However, given the specific parts of science and technology I was interested in were different for each artist-led group and artist, I initially gathered terms, paragraphs, and ideas under key words like 'art', 'science', 'experiment' and 'institution'.

In the second step, I then used axial coding to colour-code key comments with particular themes emerging from discussions. Axial coding helped identify a central characteristic which acted as an anchor, around which differences in form or properties could be identified (Mills et al., 2010). By adding context such as through secondary research, I could re-arrange data to identify key elements and relationships between them (see Strauss and Corbin, 1998). Finally, I then used Selective Coding, to pull the categories together into a more coherent narrative to help interpret the data (Price, 2010). This helped in linking together how, for example, the CPNH's conceptual framing influenced its design, and therefore how Pell might use these to experiment with ways to prompt public discussions of science and technology.

However, interpreting is different to merely coding (Crang, 2005b), and I was careful to use coding as an indicative guide which I updated accordingly throughout the research process. Interpreting data on any level is tricky, with every interpretation of data and data inclusion underpinned by the researcher's ontological and epistemological positioning (Willig, 2014). Further, analysing interviews was a different task to analysing field notes and photographs, and inevitably material analysed earlier in the process was analysed differently later, as my understanding of the context and research area developed. However, as Morton (2014) points out, in reality analysis starts much earlier in the research process, before the researcher even sits down to transcribe.

As Cindi Katz (2013) highlights, understandings of the subject area and data can also change over time, not just during the research process. Knowledge of the context develops further when reflected on *after* the study's conclusion, when new connections are made retrospectively. But so too does an understanding of what constitutes 'data', as Katz shows by deciding to publish cartoon strips expressing her data previously disregarded as lacking academic credibility (Katz, 2013). I was therefore mindful that interpreting my data was unavoidably time-specific. This section has outlined the processes I used to analyse my data, outlining how I coded and sought to draw meaningful contributions from it.

3.6. Reflections on ethnographic wayfinding

While at the CPNH, I was aware I was entering a realm I was not familiar with nor regularly a part of. This was true on a conceptual – I had had limited exposure to the postnatural as a concept – and a disciplinary level. I was a geographer working with artists, not an artist working with other artists. Consequently, there were certain practices I had to adopt. Some of these were considerable undertakings, such as using my visiting position in the art department at Carnegie Mellon University to chat to other art students to fully understand the range of media involved in artistic practices. Or, understanding the breadth and ubiquity of a concept as broad as the postnatural. Both required extended interaction for days on end before I could start to understand how these topics might be approached.

Other everyday practices were on a micro scale, sometimes even too small for me to notice day-to-day at the time before reflection. Being (even) a(n) (honorary) part of the CPNH staff meant I had to *act* like I knew what I was doing – at least to the public – even if, for the first couple of weeks at least, I was working it out as I went along. There was a performative[135] expectancy involved which required adjustment. Small things such as adjusting to Pell's idiosyncratic working hours and working on Sundays in CPNH opening hours, or attending arts conferences at weekends were new to me.

I approached every scenario with a 'say yes and figure out how to do it later' attitude. Occasionally this attitude went awry, such as when Pell asked me to write the Wikipedia entries for the CPNH and 'Postnaturalism'. He checked if I knew the computer coding procedures for editing Wikipedia pages. I confirmed I did, without a moment's hesitation, despite this being a lie. But I said I would help at the CPNH in any way necessary; if this was the help he needed, I'd have to find out a way to do it. His time was precious, he'd granted me incredible access and I learnt best kinaesthetically anyway, even if an honest answer might have meant he gave me a different task more appropriate to my skillset. I also had to ask for clarification on sketches and key terms which might have been more obvious to other artists, while talking to visitors about topics besides those involving the exhibits or subject matter

[135] For a more detailed engagement with different manifestations of performativity, see the work of Judith Butler, particularly her (1999) piece.

in a space designed to have those discussed felt very odd, even deceptive, despite my overt admission of who I was. These were the kinds of different conceptual, social and cultural layers of an institutions which ethnography can reveal according to Billo and Mountz (2016), particularly the ‘spatial analysis and associated insights into power relations’ (2016: 202-3).

Power relations in particular were complex. My initial experience at the CPNH was one consisting of both working on-site as an honorary member of CPNH staff. Yet I was also a social scientist attempting to critically engage with the space, the postnatural as a concept, and ascertain how the CPNH spoke to notions of institutional critique. To fully understand Pell’s practice at the CPNH, I had to fully immerse myself in the institution’s inner workings, positioning me as a CPNH associate rather than a researcher critiquing it. I had been inducted into the institution; part of necessary steps for building my understanding before I could attempt analysis. However, these examples did highlight my subordinate position to Pell, given he set the original institutional protocols for the institution. I initially adopted a subordinate position, partly in consideration of the generous access and support he had given me. I sought to contribute and assist at the CPNH, operating from the position of inside the institution rather than outside it, a perspective commonplace when conducting an ethnography of an institution (Billo and Mountz, 2016).

These power relations were ones another Ph.D. researcher in Pittsburgh happened to be negotiating at a similar time to me, meaning the CPNH had experience of handling and assigning roles to researchers. They were happy to be receptive to the researcher’s needs. The other researcher was studying different aspects over a longer term, so sought to take charge in decision-making where possible, and had been at the CPNH over a period of months. I, meanwhile, was there for six weeks meaning my experiences would be more fleeting. I also wanted to get behind-the-scenes to unpack Pell’s practice as manifest there, rather than attempting to influence its manifestation. On occasions I felt my role was becoming conflated or confused, I used the other researcher as a rough yardstick to give an insight into handling a particular situation.

Once I was accustomed to the CPNH's workings, I sought to adopt a more measured, critical and analytical approach. I was still an honorary CPNH staff member, but understanding how the institution fitted together along with its aims, resources and conceptual underpinnings allowed me to better situate my understanding of Pell's practice among them. When chatting to visitors I adopted a dual role; if they had questions about the exhibits or space, I could answer them as a staff member or as a researcher seeking to explore how an institution like the CPNH might encourage reflection on key issues. This dual role highlights the permeable boundaries of division between laying within and beyond institutions (Rutherford, 2007; see also Billo and Mountz, 2016) which complicate the relationship individuals have to an institution. I had originally had to develop my understanding of the postnatural which positioned me as somewhat of a student alongside Pell as a tutor, clearly inside the institution. But once I had developed my understanding, I could approach the CPNH from a critical distance, asking more probing questions and exploring the depths of its archives more meticulously to ensure I explored the parts I needed. Pell was receptive, supportive and very helpful in seeing I had the resources I needed, increasingly adopting a 'hands-off' approach the further into my stay I went.

As this account highlights, the power and ethics involved in my ethnography of this institution was complex, changed over time, and showed the different kinds of roles social scientists often must adopt when managing competing expectations and identities involved in researching such institutions.

There were also other aspects of my fieldwork which complicated my experiences, such as encountering parallel institutions first-hand for the first time. My fieldwork had given me first-hand experience of what this collection of artist-led groups and artists – and the associated parallel institutions some of them had created – were doing. Given the radical methods, content and comprisal of these parallel institutions which I come to explore further in the upcoming chapters, it was clear they had been set up because their creators felt they could possess considerable transformative potential. For each institution, this was expressed in different ways and I therefore needed to employ different ways to understand their transformative potential, and understand *why* their creators had gone to such trouble to create them.

Up until my period of fieldwork, I had naively assumed understanding the transformative potential of these parallel institutions would be a purely conceptual endeavour. However, working with this particular set of artist-led groups and artists raised unexpected practical issues related to understanding. I needed to experience them in action. But how to do this? Earlier in this chapter I mentioned my conversations with visitors at White's exhibition opening in Antwerp, as well as the focus group I ran at the CPNH and my conversations with visitors to get a better understanding of the institution(s) and the cities. While these were useful for these purposes, they were less so in understanding the transformative potential of these parallel institutions. It was clear that there was no one-size-fits-all way for people to engage with these radical spaces. Some might show interest, others completely dis-engaged. Some might meaningfully engage with the institutions there and then, others might take days, weeks or months, if at all. Even then, some individuals might struggle to articulate their experiences, while others might feel shackled in reducing their experiences down to a few words in response to targeted questions. It was therefore futile to attempt to understand the transformative potential of these institutions by solely asking these individuals.

That said, these conversations – along with the films Pell had asked me to watch for background on the postnatural – had helped provide me with a background of how visitors were (conceptually) coming to these institutions. When I thought through some of these ideas further, they helped target questions more effectively to White and Pell in interviews, and further conceptualise the spaces I was experiencing. The conversations with visitors, then, helped better understand how the artists were using their institutions to mobilise key ideas.

For the artists, they sought to use a range of different methods to prompt engagement with the material in their parallel institutions. This was where some of the transformative potential lay. Some of these methods, for example, involved crossing institutional (and sometimes state/national) borders between academia, industry, hobbyists and private enterprise to procure specific materials and establish cross-institutional ongoing conversations. Visitors therefore got the detail of academia mixed with the enthusiasm of hobbyists in the information relayed to them on display. Other methods involved the physical practices of the artists themselves;

for instance with White's physical production of key painting and sculptural exhibits in Antwerp, and with Pell's taxidermy skills with several of his displays.

However another part of the transformative potential lay with the *purpose* of these parallel institutions. These institutions demonstrated the range of ways artists have experimented in an attempt to transform people's understanding on particular topics. My fieldwork, then, had introduced me to the ways and means different artists had sought to produce their parallel institutions and their content. Tying these practices and concepts together was a relation to thinking about how these kinds of parallel institutions could conceive of (scientific) experiments in different ways. By bringing these experiments into the public realm, it invites individuals into a space where they can think along with these ideas. How these artist-led groups and parallel institutions sought to go about doing this is explored in more detail in the upcoming three chapters.

3.7. Conclusion

In this chapter, I have outlined the methodology used during the project's research process. The chapter formed two main parts, discussing first the methodological tools available to research with and subsequent ones I chose to gather empirics, and second *how* these tools were used for empirics and analysis. I covered the five predominating approaches taken by geographers working with artists and explained why I drew from approaches focusing on collaboration, using artistic practice as research, and researching the artists practices themselves to work with the artist-led groups and individual artists I did. Then, after outlining my wider methodology which I implemented to account for participants' situation at different international sites, I discussed how methods were enacted on-site in an ethnography.

Following these theoretical considerations, I then covered the practicalities of *what* was conducted where, going through research in three specific categories: in researching the network of artist-led groups, researching with Neal White, and finally with Richard Pell. Having attained empirics, I then used the final section to discuss the analysis of these empirics which helped draw meaningful contributions from the

raw ‘data’ into material which forms the basis of the next three chapters. These three chapters mirror the order I discussed the research participants in this chapter, with Chapter Four discussing empirical contributions from researching the network of artist-led groups, before Chapters Five and Six cover the practices of Neal White and Richard Pell respectively.

This chapter also showed the two-fold experimental research methods I engaged with as part of researching such experimental artistic practices. The first was using artistic practice as research as a social scientist seeking to research artistic experiments with institutions, and the second was using an ethnography to understand the lineage of conceptual influences on White’s and Pell’s practices. I now turn to explore the data these methods produced, commencing with the first empirical chapter.

4.0. Tracing the network: Artist-led groups using institutions to engage with science and technology

4.1. Introduction

In this chapter, I commence the first of three empirical chapters. In it, I explore how artist-led groups are experimentally engaging with different forms of institutions to interact with different facets of science and technology.[136] I seek to explore these artist-led groups for three reasons. The first is that these groups were experimenting with (some form of) institution(s) to engage with different (aspects) of science and technology, and therefore were central to my thesis' aim of exploring how artist-led *institutions* have emerged in such conceptual areas. They also therefore build on experimental geographies ideas, while they draw on key bodies of literature identified in Chapter Two around institutional critique. Second is their key role within a broader network of artists and artist-led groups engaging with science and technology. Each of the five[137] artist-led groups I discuss in this chapter repeatedly appeared in interviews, discussions, and secondary research surrounding White and Pell, suggesting their importance within this network.

Third, these groups in this chapter also act as a genealogy of influence for White's and Pell's practices. In my view, to understand White's and Pell's practices, I must first understand the different networks and relationships through which their work has emerged. This chapter shows this. These groups did not just appear coincidentally in these investigations, but were personally identified by White and Pell as being key influences on their practices; influences which confirm these groups' importance within this network. These groups are therefore both central to this network and my thesis in their own right on one hand, but also in underpinning and influencing White's and Pell's practices which also shape this thesis on the other. In this way, I offer a way different to previous geographers of approaching the work of individual

[136] These artist-led groups and their complex and multiple relationships are broadly summarised in Table 2 on pp. 133, which I signpost shortly.

[137] A case could be made for including the Institute for Applied Autonomy to this list, making it six. But despite their links with Pell and Steve Kurtz and therefore with this chapter, the intentional mystery and lack of information about them makes analysing their work with any authority too difficult for inclusion.

artists, by charting these genealogies of influence on personal networks to better understand their practices.

In this chapter, then, I introduce the changing contexts and histories of these five key artist-led groups regarding their different relationships to institutions and engagement with different aspects of science and technology. These groups are Artist Placement Group (APG, 1966-1989; 1989-2009 as O + I), Arts Catalyst (AC, 1993-present), Critical Art Ensemble (CAE, 1987-present), the Museum of Jurassic Technology (MJT, 1988-present), and the Center for Land Use Interpretation (CLUI, 1994-present). The first two of these were established in the UK. They span from 1966 to the present day, charting the changing context of artists' roles in society from a consignation to studio and gallery space to being invited into conversations around science and technology. The latter three are US-based, and relate to how artist-led groups have critiqued different aspects of science and technology which, for CAE, is scientific expertise; for MJT is the distinction of knowledge; and for CLUI is mapping land use to show the connections between science and technology and other industries. In all three of these US examples, the artist-led groups are using particular methods to engage audiences about these aspects of science and technology, thereby occupying a different role to APG and Arts Catalyst.

Each of the five artist-led groups positioned themselves in relation to different forms of institutions in different ways relating to different waves of institutional critique.[138] These are summarised in the table below:

[138] Where possible, I use groups' expression of their unique objectives, goals, and constitutions on their own terms. I only loosely relate their practices to one engagement with institutions to help differentiate their institutional typology amongst other groups. Their classification in one area does not remove their contribution from any other. I simply use them as a good example of that classification. Just because they are in one category, does not negate an excellent contribution to another and nor was it my intention for this to appear so.

Name	Dates active	Institutional relationship	Form of science and technology engaging with	Institutional critique wave
Artist Placement Group (APG) [UK]	1966-89; (1989-2009 under O+I)	Inside nationally-funded governmental organisations via placements.	Science and technology's increasing use in contemporary Western society.	First and second
Arts Catalyst [UK]	1994-present	Used contacts from inside research organisations to reach out to arts-based institutions.	Commission projects involving artists engaging with science and technology.	Third
Critical Art Ensemble (CAE) [USA]	1987-present	Critiqued large-scale national and international institutions, such as the pharmaceutical industry and capitalism.	Alliances between science and technology and other sectors, such as scientific expertise, and the pharmaceutical industry.	Second and third
Museum of Jurassic Technology (MJT) [USA]	1988-present	Created as a parallel institution.	Scientific classification and its ubiquity in contemporary Western knowledge production.	Fourth
Center for Land Use Interpretation (CLUI) [USA]	1994-present	Created as a parallel institution.	Alliances between science and technology and other sectors, such as the military-industrial complex.	Fourth

Table 2 – Table summarising different artist-led groups' complexities

For APG, they related to the first and second waves of institutional critique, critiquing the framing of objects and artworks, as well as the artist's role in society and in what

spaces art could be enacted, something they continued in their relaunched guise of O + I. APG sought to exploit institutions by getting inside a wide range of government and public institutions such as the government civil service and British Steel (James, 2013) to expand the roles available to artists. Arts Catalyst used contacts from inside a range of research institutions to reach out to arts-based institutions to commission projects relating to art and science. Arts Catalyst thereby related to the third wave of institutional critique, using their contacts to produce engaging art-science projects to create new institutional ways of perceiving of art. CAE critique the relationship science and technology have with powerful institutions, as evident in scientific expertise and other key capitalistic institutions like the pharmaceutical industry. In doing so, CAE invoke the second and third waves of institutional critique. For MJT, they use their role as a parallel institution to critique assumptions about knowledge based on scientific ordering. They, along with CLUI, are an example of fourth wave institutional critique, producing alternative institutions alongside existing institutions and adhering to their own protocols. Finally CLUI use their role as a parallel institution to critique how US land is apportioned based on alliances between science and technology, and key institutions, sectors, and industries, such as the military.

Throughout these five groups' engagement with institutions, each has encountered different issues, push back, and tensions from different sources. I draw particular attention to one such example in this chapter, that of Critical Art Ensemble's Steve Kurtz's (in 4.3.2.) legal tussle with US authorities. This example highlights the risk of critiquing particular powerful institutions. But it also shows exactly why these artist-led groups are so important, and by provoking such a response it demonstrates how far art has come since the days of APG in the 1960s. I now proceed through each of the five groups in turn in more detail.

4.2. Working inside, and reaching out to, institutions: Artist Placement Group and Arts Catalyst

In this section, I outline how two artist-led groups – Artist Placement Group (APG, later Organisation and Imagination [O + I]) and Arts Catalyst (AC) – have engaged

with science and technology, predominantly by positioning themselves inside or alongside other more conventional institutions such as organisations or businesses. APG were instrumental in expanding the spaces of art from the 1960s to the 1990s, challenging where art could be done and furthering discussions in the art world about what constituted art (Barry, 2013). Positioning themselves inside other institutions through placements enabled APG to open conversations around science and technology without dwelling in the spaces of art which were seen as elitist, niche, or for 'outsiders' (Ashton, 2016). Arts Catalyst's work has involved outwardly engaging with a wide range of institutions, artists and artist-led groups to secure funding, resources, venues, and personnel for projects. Commissioning art which 'experimentally and conceptually engages with science' and technology, Arts Catalyst hopes, will 'spark dynamic conversations about our changing world' (Arts Catalyst, 2016: n.p.). These two approaches are described in more detail below, and represent the first mode of institutional alignment important in mapping experimental geographies and art.

4.2.1. Artist Placement Group

In this section, I document how APG attempted to broaden perceptions of art's 'usefulness' in society in the mid-late 20th Century. They hoped this would lead to an increasing acceptance of artists to comment and provoke thought on the rapidly proliferating acceptance of science and technology as part of quotidian Western ideals.

Started in 1965 in London by Barbara Steveni, APG were a British collective. A year later, she formally established APG with her long-term associate John Latham, alongside Anna Ridley, David Hall, Jeffrey Shaw, and Barry Flanagan. Membership fluctuated in the following years, including at some point Anna Ridley, Stuart Brisley, David Hall, Rolf and Ras Sachse, Ian Breakwell, and Garth Evans (Hudek, 2009).

A main aim of APG was to promote the value and usefulness of artists in wider society. They considered artists underused and under-valued in society, and made a different contribution. According to Rasmussen (2009), Latham and Steveni argued

'[e]xpression, not economic profitability was the value of art' (in Rasmussen, 2009: 41). Its value should not be measured in economic terms because its value was its uniqueness. Art itself was valuable to society simply because it was different to everything else. For APG, 'the proper contribution of art to society is art' (Latham and Steveni, 1980: 1).

However, APG were operating in a mid-late 20th Century society which saw artists largely confined to their studios and the 'conventional gallery system' (Tate, 2016c: n.p.). According to Rasmussen (2009), APG believed this system was flawed, arguing '[t]he artist should no longer create self-sufficient and self-referential objects, but rather, should engage in different kinds of cooperation with actors outside the institution of art' (APG, in Rasmussen, 2009: 42). As Rasmussen highlights, APG argued confining artists to studios limited their engagement with non-artists. Galleries, meanwhile, were select spaces with reduced audiences displaying only a fraction of artists' work (Ferro-Thomsen, 2005). These perceptions of art's spaces pigeon-holed art[139] meaning it became increasingly abstract and hard to follow for non-artists who felt like 'outsiders' in these spaces (Ferro-Thomsen, 2005). APG sought to rectify this, challenging the 'received notions of the artist as bohemian outsider without forsaking art's sense of vocational alterity' (Ashton, 2016: n.p.).

APG's mantra, epitomised by their six key principles,[140] was concerned with society as a whole in a context of the volatile social, economic and political of late-1960s, 1970s, and 1980s UK. They sought to change perceptions of artists in society whilst

[139] By 'pigeon-holing', I mean its perception of something within its relative disciplinary space, assuming only other artists could really understand artworks (see Ferro-Thomsen, 2005). Galleries would consequently attract a very niche population, portraying the gallery as the main space for encountering art.

[140] APG's six key principles were as follows:

1. 'The context is half the work.
2. The function of medium in art is determined not so much by that factual object, as by the process and the levels of attention to which the work aims.
3. That the proper contribution of art to society is art.
4. That the status of artists within organisations must necessarily be in line with other professional persons, engaged within the organisation.
5. That the status of the artist within organisations is independent, bound by invitation rather than by instructions from authority within the organisations, department, company, to those of the long-term objectives of the whole of society.
6. That for optimum results, the position of the artist within an organisation (in the initial stages at least) should facilitate a form of cross-referencing between departments' (Latham and Steveni, 1980: 1)

ensuring artists contributed more visibly in this society (Rasmussen, 2009). This, for APG, meant understanding a need to work in public institutions contributing to society. These public institutions were often state-funded organisations such as the UK government civil service (APG, 2017), British Steel or Clare Hall Hospital (James, 2013) and, APG concluded, were where artists could contribute most effectively to, and be utilised effectively by, society.

As Barry (2013) identifies, APG's engagement with institutions was 'neither to represent nor to critique […] from the outside' (2013: 90). In this respect, their engagement with the newly-emerging institutional critique movement took on two understandings of institutions. The first related specifically to institutions associated with art, such as museums and galleries, and the second to institutions in wider society. APG believed that by expanding into spaces beyond art's associated institutions, they could introduce change to other institutions in wider society. Steveni explains their intention; that the APG were aiming '…to introduce change […] through the medium of art relative to those structures with 'elected' responsibility for shaping the future – governments, industries and academic institutions' (Steveni, in Walker, 2002: 15). APG, then, sought change by working *inside* institutions, participating in organisations' internal workings (Bishop, 2012). In doing so, they relate to the institutional critique movement of the time, attempting to change institutions from the inside as a route to shaping wider structures.

But before being able to work in these public institutions, artists first needed to be accepted into them. Consequently, APG sought to change perceptions of artists in society, through two main approaches. First, they drew on the wave of conceptual art[141] in the art world during the 1960s[142] to argue for a conceptual change in art. Channelling Latham's time-based conceptions of event structure[143] and Steveni's radical ideas, APG conceived of art as time-based rather than its traditional object-basing. The *event* was the smallest unit of measurement, not a space, and therefore

[141] I understand conceptual art, here, to mean artworks giving focus to the concepts behind the objects and materials being displayed, rather than the exhibited objects and materials themselves. Alberro and Stimson (1999) provide a much more detailed anthology on conceptual art throughout the second half of the 20th Century.

[142] See Lippard (1997) for an overview of how this affected how art objects were materially understood.

[143] Discussed further in Chapter Five.

artists' work should be explored across time rather than a particular 'thing' occupying a particular space. Latham and Steveni's radical conceptions of time-based art underpinned the social context of art. This context, they argued, dematerialised art (Lippard, 1997) and allowed for artists' contribution to be social rather than explicitly output-driven.[144] This conceptual change of art was, for Rasmussen (2009) essential:

> 'Following the dematerialization of the art object characteristic of conceptual art, it was, according to Artist Placement Group, necessary to try to give art a new role in society beyond the closed circuit of galleries, museums, and academies. […] [A]rt was a creative resource to be used throughout society. Art should not only be connected to everyday life, but also included in the production process' (Rasmussen, 2009: 41).

APG's use of social context draws comparison with Joseph Beuys' notion of social sculpture (see Jordan, 2017), both focusing on the social, rather than material, production of artworks. Both sought to use art to change society through people, though for Beuys this was through visitors becoming participants while APG used personnel in institutions. APG and Beuys conversed with each other (White, 2014), contributing to overhauling art's conception and implementation in society, and helping develop socially engaged art which reflected APG's core philosophy (Slater, 2000).

Second, Latham coined the term 'incidental person'[145] to reflect this time-based philosophy of art. For Latham, an incidental person occupied an ideological position somewhere between managers and workers in a role more representative of general society beyond just that organisation (Rasmussen, 2009). APG believed 'incidental persons' could better integrate into organisations and institutions without the associated baggage of the term 'artist'. By operating beyond the gallery and studio,

[144] Context, for APG, was so critical to their work it was included in the first of their six core principles: 'The context is half the work' (Latham and Steveni, 1980: 1).

[145] For a thorough engagement, explanation, and analysis of Latham's 'incidental person' notion, see Macdonald-Munro (2008), and also Hudek (2009).

within an institution, this incidental person could become crucial in producing knowledge.[146]

APG applied for and won 'placements' at large institutions and organisations[147] throughout their active years. Here they would be paid an equal salary and given 'complete freedom from any contractual obligation to produce a material outcome' (Hudek, 2009: n.p.), such as a report or object. Artists' contribution to placements could be recognised socially rather than physically, given sufficient autonomy to decide a project from an open brief in any appropriate form in any appropriate space without requiring a physical output (White, 2014). These were then discussed in art contexts, as well as non-art contexts, through public exhibitions and public discussions (Hudek, 2009), shifting vocabularies around art.

> 'By enabling artists to engage actively in non-art environments, the APG [sic] shifted the function of art towards 'decision-making'. […] The artist would become involved in the day-to-day work of the organisation and be paid a salary to that of other employees by the host organisation, while being given the new role of maintaining sufficient autonomy to acting [sic] on an open brief' (Tate, 2016c: n.p.).

APG, then, created an environment 'where dialogue and process are dominant' (Schofield, 2009: 186).

To ensure successful placements, both artist and organisation needed to perceive a mutual benefit. They recognised change only happened if, firstly, the placements lasted their full duration, and secondly, the wider roles available to artists changed. Artists' involvement within bureaucracy and management in organisations was therefore key (Barry, 2013), as part of an unconscious mind-set which could

[146] Stengers (2005) theorises a similar notion of the 'idiot', outlining someone outside of an organisation's inner workings who can use their position advantageously to ask potentially crucial questions or play a crucial role. Stengers states '[t]here is no point in asking him [sic] "what is more important?", for "*he does not know*". But his role is not to produce abysmal perplexity […]. We know, knowledge there is, but the idiot demands that we slow down, that we don't consider ourselves authorized to believe we possess the meaning of what we know' (Stengers, 2005: 995).

[147] Placements included stints in industry at British Steel Corporation for Garth Evans (Ashton, 2016) and in government for Latham at the Scottish Office in Edinburgh (Tate, 2016a). APG members also worked inside ESSO and the National Coal Board (Bishop, 2012; Corris, 1994).

legitimise an art practice to industrial and government professionals (Slater, 2000). APG, then, had to balance their goals, ensuring this mutual benefit but without compromising their philosophy. By involving artists in 'advisory or consulting positions' (Kester, 2004: 61) in these industrial and governmental placements, artists became involved in decision-making (White, 2014) and institutionally-internal conversations. As they became more legitimated, artists could contribute to discussions on popular interests of the time, such as science and technology. Working in institutions, then, prevented the 'inside/outside' binary from segregating practitioners, whilst avoiding the 'for/against' disposition (Hudek, 2009).

Latham believed artists could improve discussions around science and technology, and was interested in incorporating art *and* science (Ferro-Thomsen, 2005). His mentee Neal White recalls Latham's interest in science, stating "…he had very, very developed highly-honed arguments that he would have with theoretical physicists" (White, 2nd interview, 16/01/2015). For Latham, part of this engagement with science and technology was his Flat-time Theory[148] (FTT) which re-conceived of the universe as time-based comprising events rather than material-based. FTT, then, propagated views that artists could have expertise in areas beyond its designated spaces.

However, art's marginal positioning in society problematised this. Latham acknowledged science's privileged position in society, but believed they offered only a scientific insight. "[According to Latham] to be a scientist you have to have a certain sensibility shall we say […]. [Y]ou have to believe in science, you have to believe in its claims" (White, 2nd interview, 16/01/2015). Latham argued artists also

[148] Latham's mentee, Neal White, paraphrases the Flat-time oeuvre. Latham believed "the only way to understand the universe is to look at events because particles are just, well, they will disappear and re-transform. The only thing to understand is events and how events inter-relate, and so there is only a point A and point B which are interchangeable but there's always an event between these things. […] [Latham] would give a lecture and he would walk into a lecture and would get a squash ball, dip it in paint and then fire it on to the wall, and then sit down again, and go "that was my lecture". […] His claim was it was the event, it happened – something happened here. All we're left with is the data, the evidence; that's all the scientists are doing is looking at the squash racquet, the ball, the floor, the hit, the impact mark, but in fact it was another 'thing'" (Neal White, 2nd interview, 16/01/2015).

Latham also published about his FTT, and tapped into scientific lexicon by identifying himself as 'noit professor' of flat time (Tate, 2016a).

occupied a unique position in society, and being underused was instead an opportunity to provide insightful views on science in ways different to scientists.

Seeking a change in approach towards research and consultancy, in 1989 APG became a new group: Organisation + Imagination. Set up by Barbara Steveni, O + I had a different focus, being 'an independent international artist consultancy and research body' (Tate, 2016b: n.p.) more concerned with advocacy and policy than placements (Eleey, 2007). O + I defined itself as

> '…an independent, radical international artist initiative, a network consultancy and research organisation. Its board of directors, members and specialist advisers [sic] include: leading artists, senior civil servants, politicians, scientists, and academics from various disciplines and the professions. The name was changed in 1989, to distinguish it from arts administrative placement schemes set up following the APG example' (Steveni, 2001: n.p.).

They remained committed to re-positioning art within the decision-making processes of society, becoming more positioned towards outreach than internal engagement with institutions. However, Steveni reported in 2001 about the changing economic and cultural environment O + I were operating in, which was the '…increasingly money-driven, quick-fix media gratification of the day' (Steveni, 2001: n.p.). After Latham's death in 2006 which rocked the group, O + I appointed Neal White, one of Latham's mentees and board member since 2004-5, as Director. However, 'after repeated failures to obtain funding from AHRC [Arts and Humanities Research Council] and Arts Council of England' (White, 2014: 118), O + I was closed by a board vote in 2009, which White voted against.

I contend APG's work was instrumental in changing the accepted roles available to artists. They propagated social forms of art which influenced social and artist attitudes to art, as White explains:

> ‘Whilst Artist Placement Group are identified as one of the earliest artist groups engaging in social practices[149] […], it is nonetheless their ground-breaking series of placements in the UK inside national and private industries, government departments engaged with discursive/dialogical forms of exhibition that still causes artists to consider their own roles, and power in relation to other fields’ (White, 2014: 52-3).

APG were influential in the art world. They contributed to wider artistic movements[150] including those socially based as advocated by Joseph Beuys, while Rosalind Krauss built on their conception of artists expanding beyond studios and galleries for her ‘expanded field’ (Krauss, 1979; see also Hawkins, 2013) of artistic practice argument (White, 2014).[151] Their work also contributed to conceptually reconfiguring philosophies, roles, and perceptions of art, and the integration of artists into industry.

For Neal White, APG’s role was instrumental in these and successive movements in the art world. White argues ‘the expanded field and the dematerialised object provide a framework for understanding the production of art after the object or painting’ (White, 2014: 9). They laid foundations for successive movements concerned with art and practice-based research ‘as a form of knowledge production’ (White, 2014: 9). Their 43-year practice left an indelible imprint, as encapsulated by Claire Bishop:

> ‘In sum, what needs to be appreciated today is APG’s determination to provide a new post-studio framework for artistic production, to create opportunities for long-term, in-depth interdisciplinary research, to rethink the function of the exhibition, and to create an evaluative framework for both art and research that displaces any bureaucratic focus on immediate and tangible outcomes. Although these achievements are more discursive

[149] Kester (2004), Stimson and Sholette (2007), and Bishop (2012) make this claim.

[150] Some of these movements became more substantial than others. However two notable movements include conceptual art and institutional critique. APG did, however, engage with numerous other radical artist groups during their tenure. Many of these radical groups have archives stored at the MayDay Rooms (MDR) in London. Further information about the MDR is available here: http://maydayrooms.org/, and a full list of groups’ documents is available by contacting Howard Slater at MDR.

[151] White also suggests contributions by Lucy Lippard (in Lippard, 1997) as part of the ‘expanded field’ argument, which, White argues, draws on conceptual artists, notably Robert Smithson and John Latham. Both Smithson and Latham were influential on White, and their ideas are further explored in Chapter Five.

> than affective […] they are conceptual steps that anticipate broader changes in art and the economy since APG's peak of activity in the 1970s' (Bishop, 2012: 176).

These contributions had a profound influence on White and his Office of Experiments, as explored later this chapter.

4.2.2. Arts Catalyst

Nicola Triscott founded Arts Catalyst in 1993 in the UK (Wilson, 2002), four years after APG's relaunch as O + I. Arts Catalyst sought to build on APG's use of institutions to conceptually re-position art in society, responding to the 'broader changes in art and the economy' (Bishop, 2012: 176). Arts Catalyst provide practical backing for artists engaging with science, drawing on foundations laid by APG for artists to contribute to conversations with non-artists about science and technology. As they explain, Arts Catalyst contributes to art-science practice and seeks to commission '…art that experimentally and critically engages with science. [Arts Catalyst] produce provocative, playful, risk-taking projects to spark dynamic conversations about our changing world' (Arts Catalyst, 2016: n.p.). Arts Catalyst, then, provide the resources, personnel, and expertise to help artists produce projects involving science in the UK. Commissioning art projects explicitly involving science meant they could draw on resources, personnel, and expertise from otherwise unattainable sources such as science-art funding, including artist-in-residence schemes at large, significant, physical institutions such as the Science Museum.[152]

Arts Catalyst's vast, detailed knowledge of the arts sector underpins their practical support. Triscott has comprehensive institutional knowledge of operating within the contemporary art world, and brings together ideas, research, people, and institutions. Drawing on this expertise Arts Catalyst help support artists,[153] and contributing staff

[152] An artist-in-residence scheme started at the Science Museum around a similar time. Though the exact year of its initialisation is unclear, no discovered records of it pre-date 1990, and David Paskett was artist-in-residence in 1991 (Paskett, 2017).

[153] An example of this is applying for funding on their behalf.

to aid in projects such as in Critical Art Ensemble (CAE) and YoHa's *Wrecked! On the Intertidal Zone* project.[154] In this way, Arts Catalyst reach out to existing contacts and institutions, contributing necessary support to allow art-science projects to produce their own critical and experimental foci.

Often, Arts Catalyst's support has been vital for projects lacking funding, Steve Kurtz of CAE commenting "I love the Nic [Nicola Triscott], man! I would do anything for that woman! […] She almost pulled off the ultimate piece […] [and] we ended up doing something very good instead" (Kurtz, 2nd interview, 12/05/2015). For White, Arts Catalyst is fundamental in his OOE's longevity. The OOE has collaborated with Arts Catalyst several times, and is glowing in his testimony of them:

> "[My] whole story is not possible without them because […] they haven't been my gallery but they're better than a gallery. They've kind of just said well 'what do you want to do' and 'oh, that sounds interesting – maybe we can do something, maybe curate an exhibition' da-da-da, 'how much do you need', and then we go off to funding, and they write […] all the funding applications […]. [S]o I mean they are absolutely pivotal in *my* story" (White, 1st interview, 19/12/2014).

Arts Catalyst's expertise allowed art to continue in conversations with science and technology by securing funding and support for associated projects.

However, their expertise is not just restricted to functional uses. Arts Catalyst state their work is 'underpinned by research and dialogue between artists and world-class scientists and researchers' (Arts Catalyst, 2014: 3). Commissioning experimental projects helps keep Arts Catalyst in conversations around science and technology, while projects using artistic practice as research, such as OOE projects, boost their research.

For Arts Catalyst, research is crucial in engaging across art and research processes. Their research can then be used for other works or for others to conduct their own

[154] AC provided a member of staff to oversee the project and contribute to the digital presence, interest from the local community, and help garner support for the project. Further information about *Wrecked! On the Intertidal Zone* available here: http://wrecked.artscatalyst.org/content/about-wrecked.

research from or with. Through this research, Arts Catalyst have positioned themselves in a network of artists and artist-led groups who are engaging with science and technology. This network is summarised in their 2014 pamphlet (Arts Catalyst, 2014):

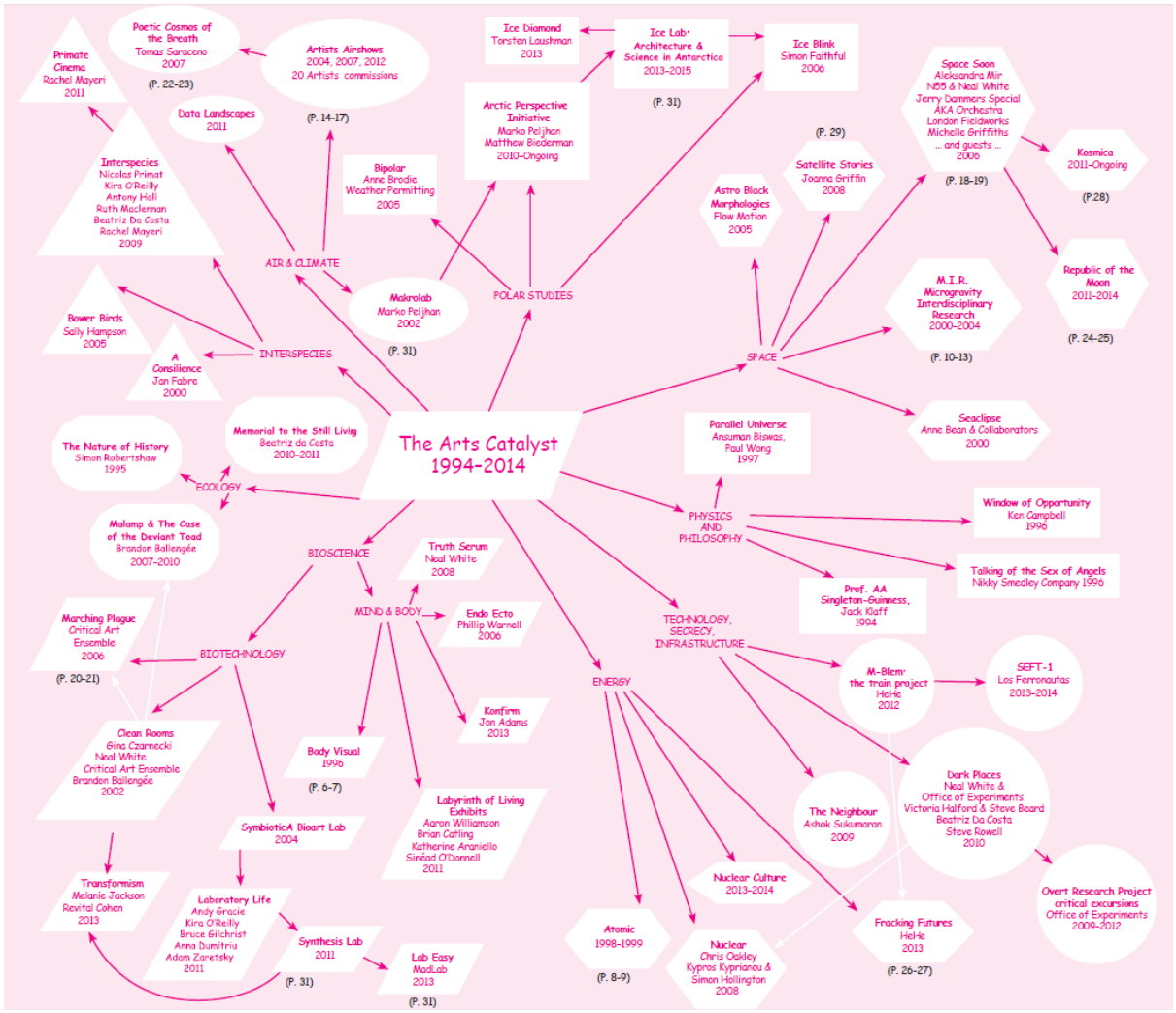

Figure 6 – Arts Catalyst networks[155]

This diagram illustrates Arts Catalyst's engagement with artistic practitioners and groups engaging with science and technology. Relationships as complex and multiple with as many groups as these, allows each to share each other's research and knowledge, and collaborate for projects.

[155] Source: http://www.artscatalyst.org/sites/default/files/project_attachments/20years-booklet.pdf.

However, Arts Catalyst are also involved in academic conversations involving art and science. Projects supported by Arts Catalyst have featured in academic publications, such as Ede (2002) on the public understanding of science, and Born and Barry (2010) on the progression of public understanding to public experimentation. In 2013, they also co-sponsored a *Curating Art and Science* Ph.D. project with Royal Holloway's Department of Geography,[156] showing how their work increasingly contributes to geographical conversations. As part of their continuing research, Arts Catalyst also opened their *Centre for Art, Science and Technology* in January 2016 as a dynamic hub for future projects (Davis, 2016). Their Centre is cross- and inter-disciplinary, building on their research ties with organisations including those with academia. These examples highlight how Arts Catalyst's research and support for projects re-affirms art's valuable role in conversations around science and technology.

What the APG and Arts Catalyst examples show is how art's relationship to institutions has changed. APG laboured to gain access in key institutions which related to repositioning the roles available to artists in society, and attempted to use artists in key institutions to improve society. APG sought to do this through existing structures in existing institutions. Arts Catalyst, however, built on the strides made by APG, reaching out to existing institutions and groups to establish a network of contacts. They have operated in conjunction with these contacts to inspire new works which critically engage with science and technology, while their Centre acts as a hub for these contacts to converse and engage with one another.

4.3. Critiquing institutions: Critical Art Ensemble

In this section, I discuss how CAE have focused on a different part of science and technology, critiquing institutional power relating to scientific expertise. I show how CAE question who is allowed to have expertise relating to 'scientific' material, and who is 'permitted' to undertake experiments. To do so, I use Tactical Media – a term

[156] The Ph.D. was to be co-supervised by two geographers (Harriet Hawkins and Deborah Dixon), both of whom have done work mapping relations between art and Geography, and two Arts Catalyst staff (Nicola Triscott and Rob La Frenais).

CAE propagated – to lay out the conceptual framework for their form of public experiments. I then take their focus of interdisciplinarity to demonstrate how they critique key institutions related to science in different projects, giving an example of a CAE project, *Flesh Machine*, to highlight how they critique the narrow distribution of scientific expertise. In these ways, CAE also relate to the second and third waves of institutional critique, critiquing the role of the artist and the accepted spaces of their practice, as well as how an institution might be altered.

This section also commences the first of the next three which move to a US context, and deals with different questions around science and technology. Notably, there is more of an explicit engagement with questions around secrecy, science and technology partnerships with other (military and/or capitalist) institutions, and the security of biotechnical information. In this section I also use CAE's Steve Kurtz and his four year court case to highlight how the fortifying of these institutional engagements meant severe consequences for even alluding to contravening any related protocols.

4.3.1. Using Tactical Media

> 'What counts in the long run is the 'use' one makes of a theory… We must start from existing practices in order to retrace the fundamental flaws' (Guattari, in CAE, 2001: 13).

Formed in 1987, CAE describe themselves as 'a collective of five tactical media practitioners of various specializations including computer graphics and web design, film/video, photography, text art, book art, and performance' (CAE, 2016: n.p.). Steve Kurtz and Steve Barnes founded CAE, the group later expanding to Kurtz's wife, Hope, Barnes's partner, Dorian Burr, and a long-term friend of Kurtz's, Beverly Schlee.

They seek to challenge or reveal 'the authoritarian underpinnings of Western culture' (CAE, in McKenzie and Schneider, 2000: 136), critiquing key Western institutions to engage audiences around different aspects of science and technology. They attempt

to do this through their propagated term ‘Tactical Media’. Being amongst the first advocates of Tactical Media, they describe it as being

> ‘a critical usage and theorization of media practice that draw on all forms of old and new, both lucid and sophisticated media, for achieving a variety of specific non-commercial goals and pushing all kinds of potentially subversive political issues’ (CAE, 2001: 5).

Tactical Media, then, uses different media as part of political and activist art. Advocates often use temporary, hit-and-run interventions to strike against key (often political) institutions. To do this, practitioners must be versatile and adapt to whatever a particular project requires. “[Y]ou shift to what will best exploit the opportunity that you see out there” (Kurtz, 2nd interview, 12/05/2015), as Kurtz explains. The appropriate media lets “the audience come, participate, [and] interpret it however they want [about] what is going on, but [lets us] be clear with our message” (Kurtz, 2nd interview, 12/05/2015). Practitioners likely camouflage themselves ‘in the shadows’ (out of the public eye) preparing a project, then ‘strike’ in a project-dependent mainstream media outlet, and retreat into the shadows to plan the next strike. It is ‘ephemeral’, and ‘leaves few material traces’ (CAE, 2001: 9). CAE derive ideological influence from De Certeau (CAE, 2001) who suggests the powerless require tactics like camouflage to withstand powerful oppression (De Certeau, 1984; see Forsyth, 2012).[157] Consequently, CAE argue institutional critique is mandatory to help prevent the powerless becoming overcome.

Here, CAE acknowledge artistic practices as being politicised (Rancière, 2004; 2002b), being a ‘particular form of politics’ (Dixon, 2009: 412) and able to comment on political issues and institutions (Dixon, 2009). Accordingly, artistic practices are well-placed to comment on different facets of science and technology, such as how they are used, what their social, cultural, economic, and political implications are, and how they can be better understood. Using Tactical Media relates to the ‘unbreakable link between representation and politics’ (CAE, 2001: 3), allowing

[157] In her (2012) Ph.D., Forsyth engages with camouflage as a historical tool for political and military gain.

projects to use representation through media forms to engage audiences about politics' overlap with quotidian life.

Crucially, in Tactical Media '…rather than just doing critical reading and theorising, practitioners go on to develop participatory events that demonstrate the critique through an experiential process' (CAE, 2001: 8). Tactical Media draws on *experiences* rather than theory to show critique and engage with participants. Consequently, participants 'place a high value on experimentation' (CAE, 2001: 3) and on experiential media. As such, CAE's work can be understood through Rancière's 'distribution of the sensible' (Rancière, 2004; in Sayers, 2005), experimenting with the conventions around the political questions of what is sayable, visible, and audible. What projects are they *allowed* to do? Where? Who decides?

To draw attention to these questions and to use the most appropriate media for a particular project, CAE draw on a second key lynchpin of Tactical Media which relates to interdisciplinarity. Kurtz explains:

> "The second thing is, the right tool for the job […]. [W]e had to throw away all the idea of fixed sets of materials, a mastery [over one set of materials] and all of that kind of thing, and had to think more collectively in interdisciplinary ways because there's lots of times the right tool none of us really knew how to use. And we'd have to invite a guest into the group who did know how to use it […] so, that's the tactical part" (Kurtz, 1st interview, 15/11/2014).

As Kurtz outlines, interdisciplinarity provides CAE versatility to adapt to opportunity without needing mastery over a fixed set of media, which might shackle their projects. It also speaks to audiences beyond 'art'-lovers. They believe "how many people want to go and see art? Almost nobody – it's a really specialised audience" (Kurtz, 2nd interview, 16/11/2015). In this way, interdisciplinarity allows for an engagement with audiences in a media most appropriate to the situation.

Interdisciplinarity also allows CAE to experiment with unfamiliar media, and experimenting is their primary mode of critiquing. As CAE's use of Guattari's quote introducing this section shows, they argue to change a critiqued institution requires

displaying current flaws to subsequently replace them. CAE primarily use experiments to display these current flaws, and to show flaws in institutional decisions. For Kurtz, experiments can be "…a really good way to make a spectacle that [reminds] people of the insanity of [a particular] initiative" (Kurtz, 2nd interview, 12/05/2015).

A key part of engaging with experiments, for CAE, involves doing experiments in public, which produces more of a spectacle and an experiential encounter for visitors. Kurtz states "…we don't do it behind closed doors, we make it completely transparent and completely public and bring it out as a performativity so that it can be viewed in that sense as well" (Kurtz, 1st interview, 16/11/2014). By doing experiments in public, CAE seek to expand the distribution of expertise, allowing more 'non-expert' – or 'layperson' (Callon et al., 2009) – people to conduct experiments. Accordingly, they dispel the requirements of only 'experts' being qualified to perform experiments in a laboratory. Experiments can be done any*where* by any*one*. Interdisciplinarity, then, means questioning the 'distribution of the sensible', *allowing* 'amateurs' like CAE (CAE, in Schneider, 2000) to talk about and conduct experiments, and do so *visibly* in public:

> 'We are amateurs, and say so very proudly. […] Most lab techniques, particularly the ones we learned, are monotonous and simple, and any idiot can do them. Contrary to expectation, the Human Genome Center is not a scientific think tank with brilliant biologists scurrying about in X-File surroundings, rather it is just a bunch of students from the general work-study pool following Betty Crocker cake recipes. […] [T]his was a myth that we were trying to break down' (CAE, in Schneider, 2000: 122).

For CAE, putting such knowledge in public is crucial to encourage 'productive public dialogues on various knowledge bases' (in Schneider, 2000: 122). Neither so scary nor complex to be expert-exclusive, the audience can experiment too. This is '…one reason why [we've worked with] on-site labs, so the audience could see that science isn't magic, and that they the audience are easily smart enough to participate in this discussion if they so desire' (CAE, in Schneider, 2000: 122). CAE, then, inspire a renewed autonomy, provoking audiences to be *producers* rather than *consumers* of

science and questioning the limited sanctioned pool of expertise they are shepherded into believing by institutions within science and technology. It also hints at what CAE argue to be a key driver behind keeping a narrow distribution of expertise, the process of selling science rather than encouraging its production by 'amateurs'. CAE, then, attempted to put in place an "…aggregate of all the gestures from all the people resisting together over time to allow for the emergence of a new way of doing […] or a new way of organising" (Kurtz, 2nd interview, 12/05/2015).

With this autonomy in mind, in CAE's project *Flesh Machine*, they conducted a public experiment in a lecture theatre, explicitly *embodying* the relationship science and technology has with capitalist institutions as a way of critiquing them. They camouflaged themselves as scientists, appearing dressed in white coats with a home-built cryo-laboratory suitable for freezing embryos, and gave a lecture about biotechnology's impact on the body. Inviting the audience to explore donor screening tests on computer screens set up around the room, CAE then gave test-passers a certificate of genetic merit. With test-passers permission, their DNA was stored in CAE's cryotanks and their photo taken. Striking similarities emerged in comparing photos' of those possessing 'genetic merit', questioning how this technology might be used for maximum profit to appeal to aesthetic perceptions of desirability. CAE then removed a frozen embryo from the tank, donated by a couple who no longer needed their eggs. Projecting a timer onto it, CAE showed the time left until it is 'evicted' from the tank, unless a volunteer from the audience paid it's 'rent'. Rent paid, it lives; if not, it dies.

Figure 7 – CAE's Flesh Machine[158]

Flesh Machine showed two main things. Firstly, that "you don't have to have a Ph.D. to be able to do it" (Kurtz, 1st interview, 16/11/2014). This relates to expertise; that, for CAE, more people are *able* to conduct scientific experiments if only science's protocols allowed for it. Secondly, *Flesh Machine* showed that this economics-based approach is the relationship science and technology has with capitalism. CAE embodied scientists to show how they have created these tools, but they also showed how decisions about how to use science and technology's advances typically end up being capitalistic decisions; decisions which leaves the fate of embryos up to the (highest) bidder.

[158] Source: http://critical-art.net/wp-content/uploads/2016/09/LG_Flesh_Machine_1.jpg.

Figure 8 – CAE's Flesh Machine pre-launch[159]

For CAE, using experiments in this way critiques the guarded relationships institutions within science and technology have with particular agencies, agendas, and organisations to keep the distribution of expertise narrow and ensure profits. Kurtz explains, stating:

> "…letting [amateur] people have the tools of biology like this? They did not like this at all. They thought that that's something that needs to stay in the hands of experts and the experts need to work for a certain entity […]. We know who those entities are: governments, military, and corporations" (Kurtz, 2nd interview, 12/05/2015).

CAE's use of Tactical Media, then, has three main implications. First, they can choose project-appropriate media. Second, they can expand the distribution of expertise. Third, they can use interdisciplinarity to maximise the impact of their projects. However, using Tactical Media in sensitive and politically charged topics in

[159] Source: http://critical-art.net/wp-content/uploads/2016/09/LG_Flesh_Machine_5.jpg.

science and technology, such as in *Flesh Machine*, can provoke an institutional response, which I now turn to.

4.3.2. Institutional push-back: Consequences of critique

Critiquing institutions, especially large, powerful institutions, entails risks. CAE frequently clashed with different forms of authority. Kurtz states "we've met all the disciplinary forces. Cops, FBI, lawyers, religious nuts, […] politicians. […] We've had […] every kind of disciplinary agency you can think of come after us at one time or another. We've met them all" (Kurtz, 2nd interview, 12/05/2015). Their work was intentionally provocative to inspire conversation, prompt thought, and draw in audiences. Aware of these risks, CAE were always careful not to break the law, Kurtz confirming "there is no project that we would do that we would think it's worth it if we have to go jail" (Kurtz, 1st interview, 16/11/2014). Kurtz identifies these clashes with authority as a necessary consequence of their critique of institutions and ideology:

> "We set ourselves up for that when you start doing that level of abstract experimentation. Where you start taking people out into a place where there's no comfort zone, and that all interpretations become welcome. Then those that don't like what you're doing, they're going to put some interpretations on it, and they're probably not going to be the ones that you're hoping for" (Kurtz, 1st interview, 16/11/2014).

The worse interpretation came in the most tragic of circumstances for Steve Kurtz. His was an instance that shaped relationships between artists in the network of artist-led groups I chart in this thesis. It went on to have implications for future practices of critical art, and for this network as the US authorities attempted to censor, curtail, and shackle artistic experiments which asked difficult questions of powerful institutional relationships.

On the morning of 11th May 2004, Hope Kurtz – Steve's partner of 27 years and CAE member – was found dead in their bed aged 45, a victim of congenital heart failure. What ensued is well summed-up by Adams (2008):

> ‘An untimely death, set against a backdrop of political paranoia, escalates into a nightmare populated by G-men in hazmat suits, shady characters, and overzealous law officials. This isn't a crazy dream. You really are being detained, interrogated, falsely accused, and barred from your home. Your possessions are ransacked, your property carted off. Never mind grieving for your lost loved one, whose body has been seized by the government; you've entered a real-life twilight zone – a state of mind driven by post-9/11 suspicion, fear, and authority run amok – and you won't be emerging anytime soon. This is a story about one Steve Kurtz, mild-mannered artist and professor, run through the wringer for reasons unclear’ (Adams, 2008: n.p.).

Kurtz’s case was a four-year legal battle, originally starting with suspicions of bioterrorism. Authorities treated Hope’s death as suspicious, given a 45-year-old woman with no known underlying health conditions had died at her home. When granted a warrant to search Kurtz’s house, authorities discovered his home laboratory, created because of a lack of work space to prepare his projects at his workplace, SUNY Buffalo. In the lab, a petri dish of harmless bacteria for an upcoming educational art project,[160] coupled with Arabic writing on the pamphlet for the exhibition[161] featuring Lebanese artist Walid Raad, led to his indictment on a bioterrorism charge. Enforcement agencies in this case included, at different stages, the FBI, the Bureau of Alcohol, Tobacco and Firearms, Homeland Security, Immigration and Customs Enforcement, the Joint Task Force on Terrorism, the Niagara County Sheriff’s office (Hirsch, 2005), and the Department of Defence. Kurtz recalls “[t]hey took my passport; put me on the terrorist watch list. They took my house away. They took all my computers; I’ll never see them again. They froze my bank accounts; they basically made me homeless and penniless” (Kurtz, interview in Adams, 2008).

[160] This project was *Marching Plague*, commissioned by Arts Catalyst and produced in 2006. It also became the subject of a CAE book, published by Autonomedia in the same year.

[161] The exhibition, and *Marching Plague*, were to be used at the upcoming show, *The Interventionists*, at the Massachusetts Museum of Contemporary Art in 2004-5.

Once congenital heart failure was discovered as the cause of Hope's death, the charge of bioterrorism was defeated in a Grand Jury – an exceptionally rare occurrence (Democracy Now!, 2008) – and was dropped. Often, once a Grand Jury case is defeated, the case is discontinued. However, authorities summoned a new charge of mail and wire fraud for the purchase of the $256-worth of harmless bacteria in the petri dish (Arts Catalyst, 2005). Mail and wire fraud is not normally a criminal charge, and relies on a party being defrauded and, usually, suing. However, no such action had been taken as no party felt defrauded. This had been one of Kurtz's concerns, as he explained in an interview, explaining "…you don't have to break a law to be accused of breaking the law. Remember that there's always tonnes of laws that the police have; anyone can be arrested at any time and charged with all kinds of crimes" (Kurtz, 2nd interview, 12/05/2015).

Mail and wire fraud was one such law, with Kurtz protesting "I'm the first person in the history of this country to ever be indicted for fraud for allegedly breaking a material transfer agreement" (Kurtz, interview in Adams, 2008). The ludicrousness of this post-9/11 and post-Lackawanna Six[162] paranoia witch-hunt against Kurtz was best summarised by this extract from the New York Times (2008):

> 'Although investigators determined that lab equipment used for DNA extraction and amplification equipment were part of his artwork and that his wife, Hope Kurtz, died of natural causes, he was indicted a month later on [mail and wire fraud] charges that carried a maximum of 20 years in prison' (NY Times, 2008: n.p.).

Such a high-profile case against a member of such a high-profile collective provoked outrage and disbelief in the artist community, enhanced when government officials crashed a gathering titled *The Interventionists*. Pell revealed the true extent of outcry in the activist artist community, particularly at the FBI's handling of the affair:

[162] The 'Lackawanna Six' was a name given to a group of six Yemeni individuals from Buffalo, NY allegedly involved in the 9/11 plot. Despite some members meeting Osama Bin Laden, they protested their innocence, and incriminating evidence was inconsistent. However, they were tried and convicted a year after 9/11. Further information available here: http://www.historycommons.org/timeline.jsp?complete_911_timeline_al_qaeda_by_region=complete_911_timeline__lackawanna_six_&timeline=complete_911_timeline.

> "…they came to the opening of that art show in order to serve subpoenas to all the other members of Critical Art Ensemble. So during the day before the opening one by one, everybody as they're going about their business heard their name called and when they turned around, that's all the confirmation they need to hand you an envelope that says that you are required to appear before a federal Grand Jury […] [W]hat the FBI *didn't* consider was that that exhibition, *The Interventionists*, was probably the largest gathering of what you might call 'tactical media practitioners' – media activist artists – that had really ever happened in the US. And so we're all there together, and we had a huge epic organisational meeting, and if you – I don't know if there are pictures of that meeting, but if you look around the circle of people, it's everybody – and so very, very quickly the case became very, very public. In fact that night, MSNBC sent a satellite truck out to the museum, so we were on live TV later on that same day" (Pell, 4th interview, 20/05/2015).

As Pell states, Kurtz's case quickly became national news, being reported in national and international news outlets.[163]

Different forms of protests were launched by several artists. One method included creating and donating to, or agreeing to produce works for sale as part of the 'CAE Defense Fund', set up to fund Kurtz's mounting legal fees. Many of the artists involved in helping this fund included those covered in this chapter, such as members of Arts Catalyst, CPNH, and OOE.[164] Selling artworks raised $167,700, which, when added to the $150,000 already spent by the time the CAE Defense Fund was launched, helped fund Kurtz's legal defence (Hirsch, 2005).

Another method was producing projects about the case. One was a joint exhibition produced by CAE and the Institute for Applied Autonomy (IAA) entitled *Seized* which was produced from objects and materials leftover at Kurtz's house after the authorities' raids. Another was a (2007) film, *Strange Culture*, directed by Lynn

[163] Examples of news outlets reporting on the case include *The Guardian* (Dowling, 2008), the *NY Times* (NY Times, 2008), and the *Pittsburgh Post-Gazette* (Thomas, 2007).

[164] Members of the Institute for Applied Autonomy also contributed to the CAE Defense Fund.

Hershman Leeson which recounted the case as it had unfolded at the time. OOE also produced their *Truth Serum* project[165] in 2008-9 produced in collaboration with Nicolas Langlitz of the Max Planck Institute which was a direct response to the case, and mimicked many of the conditions Kurtz found himself in. White described it as probing 'a dark world, within a parallel covert culture […] aim[ing] to draw attention to the role of institutions in spaces of global conflict' (White, 2011: n.p.).

Charges were pursued until Kurtz's hearing on 21st April 2008, when it was immediately thrown out on its first day, labelled as 'insufficient on its face' (Dowling, 2008: n.p.) by the judge. No appeal was launched within the 30-day limit bringing Kurtz's four-year ordeal to an end and finally allowing him the chance to grieve for his deceased wife. "I think that was the longest 30 days after the dismissal of like 'are they going to file [an appeal]? Are they going to file?' […] I remember just watching the clock turn midnight" (Kurtz, 2nd interview, 12/05/2015).

Given the severity and longevity of the case, Kurtz feels he was targeted.[166] He explains:

> "[F]or me personally, why I was a good individual for them […is] they were like "[…] if we put this person up, we're going to get to talk to three recalcitrant demographics – we're going to get to hit artists, we're going to get to hit activists, and we're going to get to hit liberal radical academics, right, we're going to be able to intimidate them all with one figurehead"" (Kurtz, 1st interview, 16/11/2014).[167]

The FBI's pursuit of Kurtz was so expensive to the taxpayer and viewed as so much of a failure that 'Kurtzgate', as it's now referred to in FBI history,[168] inspired CAE further. Nearly bankrupted, hounded from every angle, with Kurtz's house ransacked

[165] This is covered in further detail in Chapter Five.

[166] This sentiment is echoed by White (2014).

[167] Kurtz elaborated on this in his second interview, suggesting he was being used as a warning for activist artists. He suggested FBI motives included thoughts summed up as "we can kind of, all through this one guy [Kurtz], we can reach into all these communities and hold him up and say "this is what happens"" (Kurtz, 2nd interview, 12/05/2015).

[168] This came from a quote by Kurtz in his interview with me: "Since what they call 'Kurtzgate', they've really changed tactics […]. Yeah, I've got my own historical moment in the FBI!" (Kurtz, 1st interview, 16/11/2014).

as well as artworks for upcoming shows and publications confiscated and unreturned, it simply strengthened their resolve (CAE, 2006). CAE would not be intimidated. They spent the next two years re-creating all the pieces which had been seized, destroyed, and censored during the case (ibid), and remained defiant in the face of staggering adversity. Pell explains:

> "It's worth pointing out […] that Steve never stopped doing the projects that he was doing throughout that *whole* period of time. The FBI seized the manuscript he was working on; he started again. He started re-writing it from scratch, he published it. He kept doing the same biological theatrics that was behind the original projects […]. [H]e didn't back down at all" (Pell, 4th interview, 20/05/2015).

CAE's determination strengthened, their *Marching Plague* (2006) book representing, in part, a riposte to the failed attempt 'by the FBI and the Department of Justice to censor' (CAE, 2006: 7) their work. "So yeah we weren't afraid of risk", states Kurtz. "We were willing to […] risk our bodies and our mind. […] [W]e were believers, you know? And to some degree we still are" (Kurtz, 2nd interview, 12/05/2015).

As Kurtz's case shows, critiquing institutions is fraught with difficulty, on both a conceptual and practical level. The context surrounding Kurtz's case was unique. Much of it related to post-9/11 fear in the US which crept into social critique, interpreting critique as terror and therefore a threat. It marked a substantial shift from the emancipatory experiments of the 1960s and instead showcased how tightly regulated and fortified established protocol had become, inadvertently confirming what CAE had alluded to in some of their projects.

Critiquing institutions involves asking them to change their self-serving methods which some are more resistant to than others. However setting up new, 'parallel' institutions altogether side-steps this issue, and allows the founder(s) and director(s) to produce their own institutional protocols. Though Raunig (2009) critiques this approach with his 'instituent practices' argument, for some institutions this method is appropriate. And it is to two such artist-led institutions, MJT and CLUI, I now turn.

4.4. Creating new institutions: Museum of Jurassic Technology and the Center for Land Use Interpretation

In these next two sub-sections, I discuss two fourth-wave 'parallel' institutions, who have sought to go a step beyond critiquing institutions by creating their own alternate institutions. Both MJT and CLUI engage with different facets of science and technology. They use their institutions to provide them vantage points for commenting on science's role in contemporary Western knowledge production, and the alliances involving science and technology alongside other sectors such as in the military-industrial complex, respectively. By creating their own institutions, MJT and CLUI have produced their own protocols and platform to communicate from, free from previous institutions' shackling and different foci.

Unifying MJT and CLUI is their use of artistic practice as a form of research which aims to produce artworks standing as pieces of knowledge in and of themselves (White, 2014). That said, they approach this in different ways. For example, MJT has a physical building which houses their museum while CLUI is predominantly online with only a small research presence in a physical space, and consequently both offer different groundings for their different engagements with science and technology. Crucially both MJT and CLUI relate to Raunig's (2009) plea for instituent practices by seeking a non-disciplinary approach and situating their practices in relation to existing institutions which transcend disciplinary divisions. MJT and CLUI therefore represent the early stages of the critical attitude Raunig (2009) outlines as the most fruitful way of engaging with institutions to prevent institutional shackling. I now turn to explain each of MJT and CLUI in turn.

4.4.1. Parallel institution I: Museum of Jurassic Technology

The first of these two institutions[169] is the Museum of Jurassic Technology (MJT). Founded in 1988[170] by David and his wife Diana Wilson, residents of Los Angeles, MJT occupies a building[171] at 9341 Venice Boulevard in Culver City, CA.

MJT is an artist-led parallel institution, an alternative to existing institutions. They invite critical reflection on science's role in knowledge distinction. MJT highlight flaws in how scientific classification has come to be associated with validating knowledge, questioning the often – as MJT would argue – seemingly arbitrary distinctions between 'fact' and 'fiction'. Rather than aiming to correct these flaws, MJT set their own protocols.

Starting as a standalone institution,[172] for MJT, meant deciding on every aspect of the institution's form, focus, location, logistics, personnel, and research. For the Wilsons, MJT would reflect their artistic practice, seeking to question science's role in the process of research and new knowledge production.[173] For MJT, this relates to classification: what is classified as 'true' against 'false', and what is 'knowledge' against 'allegory'. The Wilsons, then, manifest their artistic practice in MJT, drawing on these ideas and a careful *Wünderkammer*-esque aesthetic, which I now come on to.

[169] I term them 'institutions' so to highlight them as parallel institutions, not necessarily negating them from being involved in the network of artist-led groups.

[170] Disputes abound over its 1988 or 1989 date of inception, though for this chapter I use the 1988 building purchase (Perrottet, 2011) as its commencement.

[171] David Wilson won a MacArthur Fellowship grant in 2001, the money from which helped in purchasing the MJT building (Maugh II, 2001).

[172] By using 'standalone' I do not mean to imply their institution had no ties any institution. Rather, they positioned themselves *in relation* to existing institutions. MJT did, however, seek to establish their own protocols which were distinct from other institutions.

[173] MJT employ artistic practice as research, though the topic of their research also happens to involve questioning the process of knowledge production and the role of research within this.

Figure 9 – MJT's exterior[174]

To demonstrate what MJT perceive as problematic knowledge distinctions, they hark back to the period of *Wünderkammern*[175] in 16th to 18th Century Europe when explorers produced new and mysterious objects from their conquest of the New World. *Wünderkammern* lacked scientific, rational, Linnaean[176] categories. They were generally eclectic, and ordered by collector's preference, or determined by their collections' contents. MJT draws on Charles Willson Peale's *Wünderkammer*-styled museum in the US which was also among the first invoking Linnaean classification. It commenced a cleavage in museums' arranging of material, moving away from the mysterious oddities presented in other collections to a more scientific, 'rational' classification.

Peale's museum employed a blend of Enlightenment and rationality, and also functioned as a gallery, studio and natural history museum. MJT utilise this

[174] Source: author's photograph. Interior photographs are forbidden under normal circumstances.

[175] Wünderkammern were otherwise known as 'cabinets of curiosity', eclectic collections of objects hosted by the gentry in 16th, 17th, and 18th Centuries, notably in Western Europe. Putnam describes a *wünderkammer* as 'an early ancestor of the museum', which, for him, 'possessed a special quality in tune with creative imagination, a quest to explore the rational and the irrational and a capricious freedom of arrangement' (Putnam, 2001: 8).

[176] I use the term 'Linnaean' categories to mean taxonomic categories *deriving* from Linnaeus' original classification of the natural world, rather than using the exact categories Linnaeus first drew up. For further information of Linnaeus' taxonomic classifications, see Müller-Wille (2007).

methodology to question why one person's classification – Linnaeus – takes precedence over individual collectors' personal classification of their own collections. MJT argue this exists in different guises across all conceptual distinctions. As Perrottet explains, this is implicated in MJT's name. 'The phrase 'Jurassic technology' is not meant literally. Instead, it evokes an era when natural history was only barely charted by science, and museums were closer to Renaissance cabinets of curiosity' (Perrottet, 2011: n.p.).

MJT's study is the Lower Jurassic, though whether this is a physical or chronological site is open to visitors' interpretation. The museum subverts classification to highlight the complex and arguably arbitrary relationship society has with knowledge distinction and its production. It showcases myths previously believed,[177] alongside contemporary known truths, and highlights their similarities.[178] MJT allude to scientific observation being one interpretation of 'nature' marking the contemporary era when previous interpretations also produced truths in their time. In doing so, they chart science's role as a knowledge validator as simply being the next in a chain of knowledge validators, stretching back to civilisation's beginnings.

MJT's practice illustrates their focus, researching these myths and discovering tales, people, and allegories which have since become the museum's metaphorical pillars. MJT doesn't just research these myths, but uses their practice *as* research to reveal the nature of distinctions between these real and fantastical allegories:

> 'The MJT does not use its art and learning to conflate the real and the imaginary but to reveal the nature of that distinction. A visit there invites us to consider the contingency of objectivism, how the distinctions drawn between the fantastic and the mundane can be arbitrary, and how those distinctions might impose arbitrary limitations on human consciousness' (Roth, 2002: 109).

[177] Myths include the glass rod of health, used to magnetically attract disease in people's homes, and that holding something which dies in one's hands caused a permanent hand tremor. One particular myth, that eating dead mice on toast was believed in the 16th Century to cure bed-wetting and urinary incontinence, was the subject of a McLaughlin (2006) article.

[178] One way they do this is through examples, such as pointing out how previous myths had some credit in Alexander Fleming's discovery of penicillin.

However, these considerations also question seemingly arbitrary distinctions which themselves impose limitations on consciousness and conceptuality. Once any worldview is held as an anchor of knowledge production, it becomes the dominant way knowledge is validated, and therefore the dominant way of researching the world. This, so MJT argue, is how the scientific process has come to dominate, limiting how new ways of researching the world can be conceived, because the scientific process dominates thinking on research.

For MJT, they operate in conjunction with existing institutions, such as museums, but also with science and knowledge's classification. They critique rather than criticise, invoke pondering instead of protesting, offering reflection not force. These crystallise thoughts on how knowledge is classified, and answer Husserl's (in Rheinberger, 2008) call for a questioning of the scientific process. They question *how* knowledge is produced in the first instance. To question this requires exposing the process itself, peeling back its layers of concealment to allude to the complicated and intriguing knowledge-producing process. Or not. Maybe it's more experiential than rational. Who knows which is which with this museum? And that's their point.

A key exhibit involves Athanasius Kircher's work, which MJT use, to question the scientific process. Kircher was a 17th Century polymath, and his belief in magnetism connecting everything in the universe – including human emotions such as love and friendship – represented the opposite of science's rationality at a crucial cleavage in how knowledge was classified in the Age of Reason. He, however, staunchly believed his magnetism theory and saw no evidence for denial, drawing on his expertise in several complex bodies of knowledge to confirm his theory. MJT pay tribute to Kircher, partly through a replica of his magnetism-based inventions, including early bifocals and explaining about his using a primitive microscope in devising the germ theory of disease.[179] These examples of Kircher's show his inventions which, although conflicting with scientific understandings of the time, offered alternative and non-scientific interpretations capable of the same result.

From Kircher's example, the implicit assumption is unless there's explicit evidence contradicting a theory which convinces its proponents, its believers consider it true.

[179] For further information about Kircher's work on the germ theory of disease, see Brauen (1982).

This could be true of science, as much as religion, fantasy, and any other worldviews. In highlighting this, MJT openly question the assumed processes of the dominant knowledge production (scientific knowledge) in contemporary Western culture. Exhibiting Kircher's work is one aspect of this, someone who '[i]n not differentiating strictly between the magical and the mundane, […] did not so much cross boundaries as ignore them' (Roth, 2002: 107). Kircher, then, epitomises much of MJT, conflating boundaries and questioning knowledge production processes.

MJT, then, use artistic practice as research in two ways. The first relates to their artistic practice *producing* research, such as on Athanasius Kircher's works, to articulate their core ideas. The second is their research questioning the wider knowledge processes underpinning the research process itself. In this vein, MJT displays objects[180] and tales spanning hundreds or thousands of years side-by-side, conflating temporality by merging tales from one time-period with common practices of another (Weschler, 1995). There is no guidance as to which object or tale, if either, has ever been 'true' or 'real' through time, which highlights knowledge's time-dependence. Things thought true in one time can be considered false in another. Who knows if something is true? How? What constitutes 'true' or 'real' and who decides? Where do these distinctions come from? Roth (2002) sums up, stating:

> '…the MJT guides the visitor through a critique of Western thought since the Renaissance, especially of the great divides between objective materialism and the subjective mind and between the realm of quantifiable science and the dominion of spirituality and belief' (2002: 104).

MJT are thus attempting to re-start a conversation drowned out through the advent of Enlightenment and post-Enlightenment science, between fact and fantasy, the rational and irrational. Their *Wünderkammer* premise underpins object selection and aesthetics, but, just like traditional *Wünderkammern*, visitors only discover its contents upon entry. Photographs inside are forbidden, and visitors asked to ensure

[180] Some of MJT's objects, such as a display of five animal horns – one of which is a unicorn horn – have an enchanting quality to them, acting as spectres of enchantment which tears individuals from their standard disposition and thrusts them into a captivating state of discombobulation (Bennett, 2001; see also Geoghegan, 2014; Woodyer and Geoghegan, 2013; Hill, 2007).

what's inside to remain as secret as possible. Richard Pell, an MJT-inspired artist,[181] explains, stating:

> "[F]or quite a long while nobody knew to go to the Museum of Jurassic Technology, you just had to be willing to ring the bell or open the door and go in, [and] find out, because there was no other way to know. David Wilson who founded it and is a huge inspiration for a lot of us, used to sit outside playing accordion – sometimes he still does to get people to come in" (Pell, 3rd interview, 19/05/2015).

Figure 10 – The mysterious doorbell Pell refers to[182]

[181] This link is explained more at this chapter's end.

[182] Source: author's photograph.

This mystery over its contents is the first part of the imagination and speculation MJT seek to inspire in visitors while spaces for speculation are created in the doubts raised over current knowledge systems. Knowledge is positioned as classified in particular arenas such as through science, which orders a certain kind of knowledge into something rational. However this ordering is a curatorial act, like decisions made in museums over what objects to collect and display. In science, some observations and recordings are taken, others ignored, and 'outliers' questioned. This refined data then gets put into another refined category of 'science', which again is curatorial. For MJT, these seeds of doubt are productive, and they exist in participants' imaginations, just like what might be behind MJT's closed doors.

The spaces of knowledge production and its process are thus shifted to residing in participants' minds. These spaces are not just *where* the *knowledge* is produced, but where the *process* of knowledge production commences through captivating and intriguing displays. At MJT, then, two spaces of knowledge production are created. One is the physical; MJT's building and displays, breeding a critical sensibility which starts visitors' questioning of the knowledge production process. The second is mental; the participants' mind-set and mental disposition tasked with connecting together what they've experienced at the physical location. What does it all mean? How else might knowledge be constituted? What other facets of knowledge have fallen through disciplinarity's cracks? MJT encourages contemplation on such questions in their roof-top tea room for visitors to think them through and reflect.

Furthermore, MJT's relationship with other existing institutions, such as museums, also requires visitors' further reflection. One key exhibit shows an arrangement of animal horns, among them sitting a unicorn's horn. Under institutional authority, it is easy to forget to question the unicorn horn and to doubt what's believed to be true (Roth, 2002). MJT are using their institutional guise to show how easily assumptions about knowledge claims are validated when portrayed in the right sources or institutions. The unicorn horn is a museum, so unicorns must exist? This approach is an invitation to critical thought, questioning everything about the space and visitors' processes for knowing and understanding.

MJT, then, use their artistic practice as research to ask critical questions about the role of scientific research processes and practices in contemporary Western knowledge production. They critically reflect on the distinctions in understanding fact from fantasy, using their research to gesture towards key points the visitor then connects in their head. In creating their own institution, MJT set their own protocols and chose their relationship to other institutions. They distance themselves from contemporary museums by not employing classification protocol in the Linnaean sense, but also engaging with other institutions, such as *Wünderkammern* to critically reflect on contemporary processes of knowledge production. In so doing, they first highlight and second question the dominance of science and technology in Western culture.

4.4.2. Parallel institution II: Center for Land Use Interpretation

From the intriguing mystique of the eclectic *Wünderkammer*-styled MJT, I now turn, finally, to its modern and technological next-door neighbour on Venice Boulevard in Culver City, CA: the Center for Land Use Interpretation (CLUI). In this final sub-section, I unpack the artist-led parallel institution known as 'CLUI' in more detail. CLUI relate to the fourth wave of institutional critique, and explore the vast US landscape to show the physical implications of how science and technology is used in other industries such as the military and national infrastructure. CLUI use social practice to show the landscape as a work of architecture reflecting American lifestyles, politics, and economics, thus showing the landscape as a product of applying science and technology in different ways. I now explain how CLUI do this.

In 1994, Matthew Coolidge founded the Center for Land Use Interpretation (CLUI), a non-profit organisation based in Culver City, CA. While CLUI have a physical headquarters in Culver City, CA, they predominantly produce work for an online audience. Their physical building acts as a gift shop, small exhibition space,[183] and a work space for their researchers when they're not away on field work. It is a physical

[183] The exhibition space is typically big enough for one small exhibition at a time.

space for running the organisation; its administrative purpose highlighted by its bland and easy-to-miss exterior:

Figure 11 – CLUI headquarters[184]

CLUI as US-specific, reads the US landscape as a product of culture, reflecting human processes and decisions over time. Steve Rowell, Program Manager at CLUI, explains their focus, stating "we coined this term, 'anthropogeomorphology'; this sort of human-altered shaping of the earth" (Rowell, 1st interview, 12/11/2014). This 'anthropogeomorphology' shows the US landscape as a form of architecture, arguing all the geomorphological processes acting on the landscape directly result from decisions made by people.

An art-based parallel institution like MJT, CLUI also uses artistic practice as research but in a different context. They aim to increase the production and diffusion of knowledge around large scale US institutional landscapes. CLUI's research focus concerns power, authority, and transparency. They argue particular sites, such as military or infrastructural sites, show how existing national and international-scale US institutions – such as US research and development – elevate power to some people over others. These manifest in the uniquely massive and frequently sparse US landscape differently to in, say, the congested and complex cultural UK landscapes.

[184] Source: author's photograph.

CLUI's expertise are US-focused, and they travel the US using on-the-ground fieldwork to search for and photograph pre-researched[185] facilities, sites, and dwellings. They then use these sites as part of their dedication 'to the increase and diffusion of knowledge about how the nation's lands are apportioned, utilized and perceived' (CLUI, 2016a: n.p.).

According to Borgdorff (2012; 2010), art-based parallel institutions like MJT and CLUI show how artistic research now crosses life domains and academic disciplines. Borne from a passionate 'enthusiasm for knowledge beyond disciplines' (White, 2014: 9) this has implications for art, knowledge and institutions. In bridging disciplines and life domains, artistic practice as research, then, produces artworks which become a new form of knowledge.

To research the landscape, CLUI uses research methods familiar to geographers. They use on-the-ground fieldwork to explore pre-researched sites, often photographing them and situating them in the landscape by mapping and imaging both the site(s) and the landscape. In this way, CLUI represent a turn full circle back towards geographic inquisition but do so without a disciplinary anchoring. Their artistic practice is a form of research drawing on geographic methods.

This practice manifests in one of their main projects, their *Land Use Database (LUDB)*, which also demonstrates the relationship between artworks and new forms of knowledge. The *LUDB* is an online-based archive, described by the Center as*:*

> '…an evolving and expanding catalog [sic] of unusual and exemplary places across the USA, highlighted and described by the CLUI. It is an annotation of the landscape as artefact [sic], a product of our economy and society, an altered topography shaped by our individual and collective activities' (CLUI, 2016c: n.p.).

[185] The research done before visits is typically done by CLUI researchers.

The *LUDB* takes a zoom-able Google maps image of the USA and marks on the location of 'unusual and exemplary sites'[186] across the country. Each is titled and offers more information with a click:

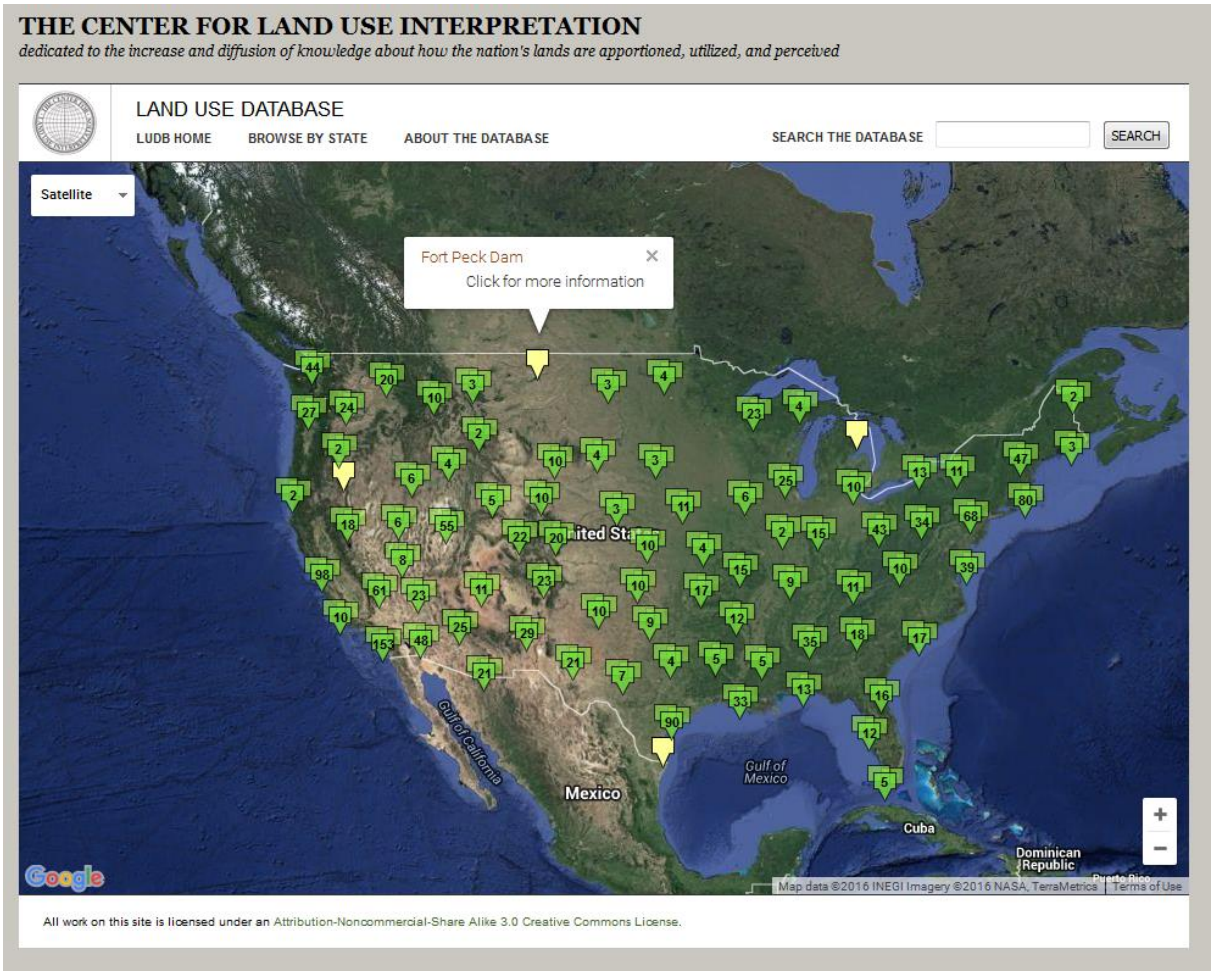

Figure 12 – LUDB from afar[187]

CLUI provide site-specific information, including usually the co-ordinates and directions for travel, offering opportunities for visitor exploration in their own time. Links are provided as further research start-points, accessible with another click.

[186] What sites meet the classification of 'unusual and exemplary' remains a CLUI judgement call, fraught with subjective difficulties.

[187] Source: http://www.clui.org/ludb/site-mapped/13/6246. When following this link, the image initially comes out zoomed-in, but this can be made to match my screenshot by zooming out to an appropriate level.

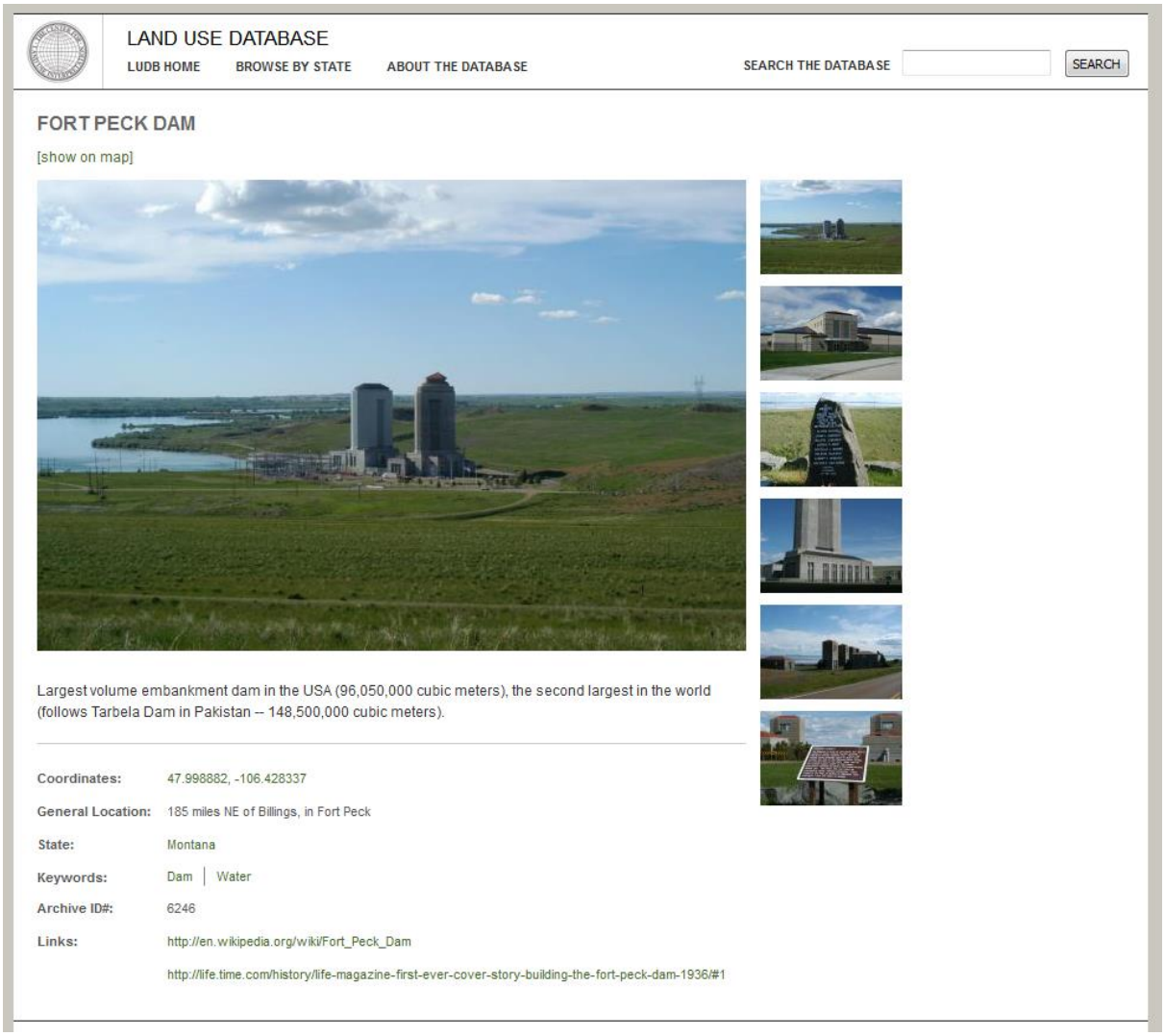

Figure 13 – LUDB up close[188]

The *LUDB* implicitly explicates the processes and institutions which produce the landscape as an artefact (Kanouse, 2005). What are the institutions which produced

[188] Source: http://www.clui.org/ludb/site/fort-peck-dam.

and maintain, for example, the Nellis Range Complex in Nevada?[189] How does it work? What are its cultural implications and impacts on the landscape? Including the complex on the *LUDB* invites similar questions of such sites which often aim to remain *out* of the public eye. It forces them to confront these questions, questions they have sought to dodge by remaining out the public eye. Opening these questions helps make these sites more transparent and encourages conversations about them. *Which* questions are asked is not as important as them simply being *asked*. Putting sites like the Nellis Range Complex on the map, metaphorically and literally, coaxes these evasive institutions out and into public realms they hoped to avoid, putting information about them into the public realm.

Oftentimes CLUI's independent research into evasive sites, such as those in the US military-industrial complex, creates security problems. Although CLUI's intention is not malicious, the US are very strict on military security protocol. Rowell explains:

> "I know that [malicious intent is] their concern, that there's something about the view of a sensitive site which could allow someone to exploit some security flaw on the perimeter or something. […] So you have to be extremely careful. But at the same time, we are allowed to photograph things in the environment from public property, and the intent is not to disclose like a security breach but just to reveal information about the landscape in general" (Rowell, 1st interview, 12/11/2014).

[189] CLUI's *LUDB* entry for the Nellis Range Complex is as follows (as of 10/03/2017): 'The Nellis Range is a 4,700 square-mile restricted zone in southern Nevada, and one of the largest and busiest military ranges in the country. Much of the land in the range is used for combat training by the Air Force, which conducts large-scale war games over the range, and within the 12,000 square-mile restricted air space above and around it. Associated with this combat training are fixed and mobile threat-simulators, simulated enemy air fields, mock industrial facilities, radar stations, and telemetry facilities. Target objects, such as tanks and aircraft, are set up for inert and live bombing practice, and portions of the range are wired for electronic warfare training. Also within the range are several large-scale complexes with distinct functions and histories, including the base at Groom Lake (AKA Area 51), a 'secret' Air Force base which is known as the development, test, and evaluation site for numerous advanced aircraft and weapons systems. At the north end of the range is the Tonopah Test Range, managed by Sandia National Labs, and used as a base for weapons testing and development, including, recently, earth-penetrating bombs. On the west side of Nellis is Indian Springs Auxiliary Field, an Unmanned Aerial Vehicle (UAV) test base for the Department of Defense' (CLUI, 2017a: n.p.).

With strategic infrastructure making access problematic, CLUI use a mix of tenacity, a long-zoom lens and independent research. With enormous distances travelling across the US, travel times are lengthy and ground research often frustrating because of photograph and personnel restrictions. Sometimes being on the ground at all, or any photos involving *any* part of the site is treated as a security breach:

> "I've been stopped, I've been held for a few hours in some sites. I've had […] follow-up phone calls and web searches from DoD [Department of Defense], IP addresses, FBI, Joint Terrorism Task Force phone calls, you know things like that. […] [T]he FBI's tailed us […]. I've had other things happen to my computer that I suspect is [the] government, sort of, fiddling with my files. I've actually had entire images, one entire day's worth of images go missing, not just from one computer but from all the hard drives the image is sat on. […] [In this instance] I didn't actually take any pictures of the site itself but I photographed the trees and the hillside driving up to that site, and then all the photographs that I took earlier in the day that were in Gettysburg, Pennsylvania [historic war memorial site] […] were all deleted too" (Rowell, 1st interview, 12/11/2014).

Such tight security makes finding out site information difficult. The 'official word' on many of these sites is either denial or extremely limited information, requiring digging from other sources. In doing so, CLUI highlight the lengths they must resort to when deviating from these institutions' preferred protocol of knowledge production.

But as CLUI acquire information, their artistic practice leads, in a concrete sense, to new knowledge for people not previously knowing about these sites. This artwork exists as knowledge, to paraphrase White (2014), highlighting sites and knowledge about sites often overlooked or concealed by institutions. So while this thesis explores institutional processes implicated in creating new forms of knowledge, this hints at institutions' role in *concealing* or *removing* knowledge which either sits outside classification, or is *perceived* to threaten approved knowledge production methods which tightly regulate how science and technology is applied – especially in business and governmental organisations – and by whom.

CLUI also use two other ways to question the processes and institutions (within science and technology) implicated in shaping landscape relates to their presentation of information. Firstly, as the *LUDB* screenshots show, CLUI aim to position themselves as 'neutral'[190] and non-disciplinary (Rugoff, 2006). They present work without clear opinions, striving for a neutrality to invite (online) visitors' (mental) agency to decide an opinion. CLUI provide the material and images, and the visitor makes their own mind up. Their website mirrors this, with simple, clear fonts and digestible descriptions. They omit the term 'art' despite being known for artistically inclined work in this community, to keep away from this framing. Omitting opinion-laden signifiers or terms with baggage, such as 'art', helps remove the work's disciplinary or political framing. CLUI hope this allows for open-minded interaction instead of ham-fisted opinions convoluting engagement. At least, that's CLUI's hope.

I instead argue CLUI still adopt a position – and are therefore not neutral – but not one *directly* confrontational. An apolitical, 'neutral' voice seems fanciful, and perhaps misleading. Is it neutral when a site's inclusion clearly displays a politics and bias? Or when CLUI's existence at all also shows a political interest and bias? CLUI's opinions instead manifest more discretely, in deciding which sites to research and explore further on foot, which 'unusual and exemplary sites' to include, and which information about these sites to include on the *LUDB*.

This argument considering framing of information also hints at a crucial part of knowledge production: its classification. The non-disciplinary and apolitical voice shows that these sites expand beyond specific disciplines and institutions, instead being implicated *across* them. For Matt Coolidge, CLUI's founder, part of the Center's relationship with knowledge and classification hinges on perspective and perception. When asked about the role of research in an interview with Jeffrey Kastner (2005), Coolidge remarks on developing new perspectives, like '…maybe one that allows you to become less sure, to realise things aren't quite as certain as you thought' (Coolidge, in Kastner, 2005: 287).

[190] The term 'neutral' is inherently problematic given how subjective many of CLUI's research foci are, such as what constitutes 'human-altered' for instance. However, neutrality is discussed further in the next paragraph. Their goal is neutrality, and at this part of my engagement with CLUI, I am outlining their goal.

Coolidge openly questions the process of knowledge production, questioning what constitutes 'fact' and suggesting they are not always as concrete as presumed. This, for Coolidge and Simons (2006), relates to an aspired 'widened sense of awareness', as highlighted in their (2006) foreword:

> '[I]t's my hope that, after reading [this], you forget about us. You can even forget the information about the sites we describe in this volume […]. In fact, you can even forget the very point that is being made right now. What matters is that after reading this book, or after encountering any of our programming elsewhere, you come away with a widened sense of awareness of the physical world that surrounds you' (Coolidge and Simons, 2006: 15).

But to appreciate a 'widened sense of awareness', for Coolidge, means accepting connections between institutions and disciplines. For this reason, CLUI adopts a non-disciplinary approach which Rugoff (2006) explains:

> 'In contrast to our culture of experts – the pundits, academics, and government analysts who regularly appear in the media to tell us what to think – the Center is a haven of amateur agnostics. Its members are specialists who specialize in non-specialization. Their approach is not so much multidisciplinary as **nondisciplinary**: it traces out an underlying logic that connects disparate fields and perspectives linking them to the common ground of land use and its interpretation' (Rugoff, 2006: 39 [emphasis added]).

Rather than using different disciplines, Rugoff asserts CLUI instead produce material *transcending* disciplines to reflect the non-disciplinary character of landscape. Sites they research are not inherently disciplinary or classified, they just exist. They just are. *Then* institutions classify them. CLUI succeeds in straddling the line between these positions and disciplines, 'perpetually shifting from a curatorial role to that of a tourist, archivist or researcher without ever exclusively endorsing these functions' (Bélanger, 2008: 19). They therefore avoid disciplinary tethering to reflect a broader understanding of the landscape.

Secondly, CLUI use social practice as a form of artistic practice as research to allow them to engage with the (science and technology) processes underpinning the landscape. Part of the way they do this is by involving experimental methods to engage visitors. They, like APG, draw on social practice as derived from Joseph Beuys' 'social sculpture' notion. Whilst much of their work is digital, they also take visitors to pre-set sites on bus tours as part of their engagement with social practice. According to Kanouse (2005), Coolidge argues bus tours help keep visitors grounded in the land they're experiencing. There's no substitute for being in the space, Coolidge asserts.

The bus journey is refined and curated, involving personnel, monitors, video clips and cleverly timed photographs corresponding to the itinerary. Local 'experts', amateur enthusiasts and spokespeople board the bus at various points, providing analysis, viewpoints and, sometimes diverging, commentary (Kastner, 2005). For Kanouse, these social interactions on bus tours 'offer opportunities for conversation and interaction with other tourists, mirroring the social creation of the landscape with the social creation of its interpretation' (2005: 83). This mix of social interaction, technology, and ideas reflect three significant impacts on landscape: ideas on how to apportion and use the landscape, getting permission for land use, and using technology as the means to enact these ideas.

In using this mix of these three, the bus tours also help show the physicality of ideas and abstract concepts such as those from science and technology theories and developments. Sites visited range from large ore pits, to shipment container ports, to sites of military and security interest, all of which are implicated somewhere in the web of structures, infrastructure, relationships, and flow of capital sustaining the USA's daily habits. Rowell elaborates on this sentiment, explaining about a similar project undertaken on the internet's physicality:

> *"…*we did a project […] about the internet, about the physicality of the internet so we went and photographed all these cool locations, server facilities around the country to show that there's a physicality behind the cloud; it's not [… just] where our data's kept, there's things like air conditioners to cool the machines that, you know, store our privacy, data

and all of our chats […] are actually being physically kept somewhere" (Rowell, 1st interview, 12/11/2014).

As Rowell touches on, physicality goes beyond objects to include relations and networks. These can be commercial, military, industrial or other categories in nature, but they take from the landscape too. There are decisions around these, as well as attitudes towards the landscape developed by CLUI here. How are these sites seen and experienced in the landscape? Some are concealed in the vast American scale, while others have warning signs and other deterrents warning visitors away. Others still are pillaged as resources, a necessary evil to fuel the demand sustaining the US economy. With so many angles to consider, CLUI does not aim to explain all of them, but instead to hint at them and inspire visitors to reflect on the institutions and their relations.

CLUI, then, as a parallel institution, use artistic practice as research to engage with contemporary issues in science and technology. They do this in three main ways. First, CLUI question knowledge production through using artistic practice as research to research particular 'unusual and exemplary' sites which manifest the application of science and technology in different ways. Second, they attempt a 'neutral' stance and seek nondisciplinarity to reflect the sites' non-disciplinary characteristics as part of broad and complex networks. Third, they use social practice to encourage users'[191] critical reflection about the sites, their use, and their basing in everyday habits. CLUI represent the final of the five groups comprising this chapter, each of which influences White's and Pell's practices in key ways which I now turn to outline.

[191] At different junctures, people experiencing CLUI's work can be perceived as having different roles according to how CLUI engages with them. Terms such as 'users' (in the case of those using CLUI's research), 'visitors' (for those visiting CLUI's online resources), or 'participants' (for those involved in CLUI's explicit social practice projects, such as its bus tours) can all be used to describe individuals engaging with CLUI's work at different junctures in different projects.

4.5. Following the network: The Office of Experiments and the Center for PostNatural History

These five groups have each brought a different relationship to institutions and engagement with different forms of science and technology. These relationships have not only been central to the network I have outlined in this chapter, but have also been instrumental in contributing[192] to the practices[193] of White and Pell as manifest in their key institutions, the Office of Experiments and the Center for PostNatural History.

White's OOE draws primarily from APG, Arts Catalyst, CAE, and CLUI. Each of these White explicitly cited in interviews, drawing on key principles and/or personnel. OOE recognise APG's importance in altering art's perception in society, drawing on their socially engaged art operating beyond a studio and gallery. APG's key articles

[192] All five of these groups contribute to White's and Pell's practices in ways beyond the scope of the thesis. Further, while they are five key groups *I* identify as contributing to White's and Pell's practices, they are by no means the *only* groups to contribute to their practices; to list *all* contributors through all their professional histories would be beyond even the artists themselves.

[193] Whilst this chapter outlines these groups as influences on White's and Pell's practices, I also acknowledge influence is not a linear, progressive, one-way relationship. As White's and Pell's practices, projects, and institutions have become increasingly established, they could arguably be, themselves, influencing these groups.

and principles underpin the OOE's,[194] and use these to engage with different institutions as part of a critique on different forms of science and technology.

APG's John Latham also became a close friend and mentor to White, and whose influence cannot be overstated. "If you want to find out about Neal, find out about John. That's really where he comes from" (Hudek, 1st interview, 16/11/2015) was Antony Hudek's – long-time collaborator with White and Objectif Director – advice over a lunchtime conversation. Triscott (2012) argues Latham's influence on White is an open secret, highlighting White's response to a funding body questioning the 'benefits' of his 2005-6 project *The Self-Experimenter and The Void*. Triscott (2012) states White 'quoted the late artist John Latham on the 'benefits' of art: 'the contribution of art to society is art'' (Triscott, 2012: n.p.).

Arts Catalyst's relationship with White is more practical than conceptual, but clearly seen as vital in his mention of them earlier in this chapter, stating "my whole story is not possible without them" (White, 1st interview, December 2014). Arts Catalyst cemented, and are expanding, a conceptual space engaging with science and technology which White contributes to, and provide collaborators when necessary. One collaboration example was with White and CAE:

---

[194] The OOE's original principles and articles are as follows:
'1. The prevailing definition of 'Experimental' as a repeatable recurring fixed event which gives rise to repeatable consistent reading (leading to truth) cannot take account for the variability of all events between the readings. The definition is therefore annulled as inconsistent (leading to non-truth).(a)
2. The Office of Experiments 'experimental' logic will take account for events as affective on other events and therefore all knowledge, which in turn is continually in flux.
3. The Office of Experiments will not produce data for analysis, but events are documented. To move to analysis of events developed through experiments is to perform or re-enact the mistakes of science.
4. The method and research is based on action, and does not depend on the verbal idiom. In action there is the acceptance of the non-extended state as a part of the condition of the event.(b)
5. The Office of Experiments is committed to the development of event-structures, based on evenometry as it describes the nature of events through time.
6. The OFFICE of […] The Office of Experiments itself can only occur as a manifestation of energy, is non-fixed and is a response to context. It is therefore not fixed in space, but is fluid in time.
7. Office of Experiments regards time as an event base that gives rise to and maintains all structures, objects, matter and systems. And also reclaims all structure, objects, matter and systems.
8. There has been a shift.
9. There is a void.
a) Not to be confused with the Heisenberg principle, or observer/observed arguments.
b) Spoken language is slippery too and other than an event in itself, is also almost always a shadow of the real event. As it always also in the now it also has no extended state (unlike the written word). See Flat Time Event Theory' (OOE, 2016b: n.p.).

> "I first started working alongside Steve Kurtz in 2001 because we did an exhibition together called *CleanRooms*. […] That was curated by Rob La Frenais [formerly at Arts Catalyst] […]. [H]e wanted to put me in a show and he asked me who I'd like to exhibit with, […] and both me and somebody else both picked Critical Art Ensemble. So he approached them and I got to meet them through that route" (White, 1st interview, 19/12/2014).

This collaboration with CAE led to personal friendships, while White also utilised their Tactical Media approach in his OOE work. Of CAE, White stated

> "I think they were the first people to critically awaken my artistic sensibilities because I was interested and engaged in these institutions but I really liked the methodology, and learnt a lot from the methodology of Critical Art Ensemble by looking at it quite carefully and thinking about it" (White, 1st interview, 19/12/2014).

By critiquing institutions, the OOE shares interests with CAE, using their respective positions to ask difficult questions of existing knowledge and institutions systemic and normalised, such as those within science, and the distribution of expertise and locations of experiments. To do so, the OOE have used a range of formats – covered next chapter – stemming from CAE's versatility and their use of Tactical Media.

Finally White himself highlights CLUI's influence on his practice in his Ph.D. thesis (White, 2014), drawing on them to discuss the OOE's *Dark Places* project. *Dark Places* was loosely based on a CLUI bus tour and autonomous researcher approach to researching sensitive, but public, sites.[195] White also participated on their now-defunct residency programme[196] across the late-2000s. Whilst there, he met future collaborator and OOE Independent Research Director Steve Rowell, and CLUI's founder Matt Coolidge, becoming fascinated with their take on land use. White

[195] This might also have been inspired by his collaboration with CLUI's Program Manager, Steve Rowell, for *Dark Places*.

[196] CLUI's now-defunct residency programme involved a placement at their outlet in Wendover, Utah designed for 'anyone who works with land and land use issues in an innovative and engaging manner' (CLUI, 2016b: n.p.).

attests "…my methods are all based on working with CLUI, and came out of thinking about Critical Art Ensemble" (White, 1st interview, 19/12/2014). White integrated several CLUI-inspired ideas into OOE work, such as using bus tours as social practice and to aid visitor experience. White also draws on their *LUDB* to produce the OOE's *A Field User's Guide to Dark Places – South Edition* online database.[197]

The CPNH, on the other hand, derives influence, like White, mainly from CAE and CLUI, but also from MJT. Firstly, CAE's approach to Tactical Media and Kurtz's case decided what form the CPNH would take. As a public outreach centre, the CPNH seeks to encourage critical reflection on contemporary science and technology, like CAE does, by pushing against something.[198] The CPNH encourage visitors' autonomy by guiding them to do their own research.

The CPNH's Director, Richard Pell, also shares other interests with CAE, such as an interest in political resistance and hacking in science and technology. He also has a close personal friendship with Kurtz, being a student of Kurtz's whilst studying at Carnegie Mellon University:

> "[Kurtz] was a huge influence. […] I was a computer hacker that went off to art school and he was one of the few people […] who understood hacking in the way that I did. It's not to say that Steve was a computer hacker, but he understood […] the political and the social power of it. [… I] sought him out as an advisor, started taking his classes, and you know he was the one that after I had graduated I kind of asked '[…] how do we get to the next step, how does this stuff stop being just kind of projects that I do at home – how do I find a larger audience?" (Pell, 4th interview, 20/05/2015).

Kurtz aided Pell in founding the IAA and co-wrote their founding manifesto with Pell entitled *Contestational Robotics*. Their close relationship was drawn on during Kurtz's case, Pell states "while the FBI was raiding Steve, he came and stayed with us in Troy [New York]" (Pell, 4th interview, 20/05/2015), To show solidarity, Pell was

[197] This OOE experimental database was produced as part of their *Dark Places* exhibition at John Hansard Gallery in Southampton. This exhibition provided an insight into the OOE's *Overt Research Project*, which the database and bus tour were a part of.

[198] In the CPNH's case, they push against humankind's exploitative relationship with its environment, and the fact this is un-acknowledged by natural history museums.

a key contributor to the CAE Defense Fund, and collaborated as part of the IAA with CAE for their project *Seized*, an exhibition of FBI-curated leftovers at Kurtz's house. He is acknowledged in CAE's 2006 book *Marching Plague: Germ Warfare and Global Public Health*. Upon the IAA's cessation and the CPNH's inception, Pell sought out Kurtz for advice about how best to present his CPNH without arousing the same kind of suspicion which targeted Kurtz. Upon Kurtz's advice, Pell devised an open and public approach to eliminate suspicion.

Pell also draws influence from CLUI, particularly their founder Matt Coolidge:

> "Matt [Coolidge] is the person that really…called my attention to […] the power of the neutral voice, and it took me years before I got good at it […]. [I]t was through, you know, long car-rides with Matt, asking him endless questions that he, you know, presented back – that is the radical gesture – that I really came to appreciate that. So I just want to make sure that he's fully credited" (Pell, 4th interview, 20/05/2015).

The long car journeys Pell refers to were during his time on CLUI's Wendover residency programme in Utah which he, like White, attended.[199] Inspired by CLUI, Pell adopted a neutral display.

> "[O]ver time what we realised was how powerful [neutrality] was, and by talking about things that are highly politicised elsewhere, even highly controversial in other media, and talking about the same things in kind of a neutral voice is strangely shocking to people, and even aggravating" (Pell, 4th interview, 20/05/2015).

'Neutrality', then, was an aesthetic choice. At CLUI's headquarters, material is displayed disproportionately in favour of exhibit over (if any) explanatory notes, a template Pell follows at the CPNH. This decision also reflects the non-disciplinarity of the CPNH, which is also drawn from CLUI and their anthropogeomorphological reading of the landscape. For Pell, the postnatural's breadth eclipses disciplines but

[199] Pell was resident in the early-2000s with collaborators, one of whom would go on to become half of the Yes Men: Igor Vamos. A close association formed between the Yes Men, their collaborators and former projects, and the IAA, with overlaps a regular occurrence.

also sees the living world as a reflection of cultural desire, being shaped by human decisions on macro and micro scales to reflect their desires.

Finally, Pell also draws on MJT. They are influential in the CPNH's aesthetics, from colour scheme to display presentation. MJT's evoking of wonder and enchantment in their *Wünderkammer*-inspired presentation also influenced the CPNH. This wonder is stimulated to encourage participants to act on what they experience, the CPNH drawing on social practice from both MJT and CLUI in this way. Both also use stories about key objects, though at MJT stories tend to be used through individuals' works, like Athanasius Kircher, while at the CPNH key objects have their own stories told alongside narrative. In interviews, Pell referred to MJT's co-founder David Wilson as a "huge inspiration" (Pell, 3rd interview, 19/05/2015), outlining his personal admiration for Wilson's work. The CPNH also mimics Charles Willson Peale's infamous painting *The Artist in His Museum*[200] by adopting a curtain which hides the mysterious delights behind it.

For Steve Rowell, CPNH's lineage is clear:

> "[Pell] kind of took Critical Art Ensemble, CLUI, MJT and put this idea together called the Center for PostNatural History. He started as like a store-front thing, in Troy [New York] and then later got a Creative Capital Fund and started it in Pittsburgh" (Rowell, 1st interview, 12/11/2014).

This genealogy Rowell outlines also maps influences and positions. It states how ideas became shared and integrated into new ventures, explaining how these come together at the CPNH. Previously, this is exactly the kind of mapping of influences and positions which can get overlooked when geographers focus solely on one artist. It therefore highlights one way this thesis seeks to change this by exploring not just other groups important in the network I have explored in this chapter, but showcasing influences to map the lineage of key ideas and positions to better understand White's and Pell's works.

Throughout this chapter, I have built on understandings of these groups' works to explore how these groups are part of, and have led to, further emergence of artist-

[200] This Peale painting is used on the front cover of Weschler's (1995) book about MJT.

led *institutions*, with two key ones – the OOE and CPNH – taking direct influence from these groups. Their changing histories and contexts outlined in this chapter helps explain their different and experimental relationships to institutions, and to different aspects of science and technology which mobilised different ways of publicly engaging with science and technology. They each experiment in different ways with institutions to engage publicly with science and technology, producing without guarantees and seeking an improvement (Paglen, 2009b). These groups' institutional relationships also broadly correspond to changes in institutional critique. APG worked *inside* institutions, and Arts Catalyst solidified the conceptual shift of artists and their perception in society in discussing science and technology. CAE *critique* existing institutions, while MJT and CLUI are *parallel* institutions.

Further, these five groups highlight lineages of ideas towards the OOE and CPNH, and indicate the wider network of artist-led groups engaging with science and technology. Their diverse modes of experimenting with institutions relates to the different waves of institutional critique which also relate to geographical conversations around experiments. These relations are mirrored in the different topologies of institutional engagement the five groups have implemented, such as operating inside (APG), outside (Arts Catalyst and CAE), and alongside (MJT and CLUI) existing institutions. Accordingly, institutional critique waves and their associated topologies have implications for ways of thinking about critique and change, which have manifest in these groups' approaches to engaging with different aspects of science and technology.

This chapter has offered a map of how influences and institutional forms have overlapped with one another relating to institutions, engagements with science and technology, and waves of institutional critique. Having mapped these influences and overlaps, the next two chapters look in more detail at what happens in the situated knowledge and imaginative practices that each produce. I do this by focusing on two key contributors to this network whose work has become increasingly involved in more audible geographical conversations: Neal White and Richard Pell. I now explore both of them, commencing with White in Chapter Five and Pell in Chapter Six.

5.0. Experimenting in practice: Neal White and the Office of Experiments

In this chapter, I explore the work of artist and researcher Neal White and his Office of Experiments, a parallel institution established by White in 2004-5. The OOE stems from relationships, expertise, and ideas shared from different groups influential on White, many of whom were discussed in Chapter Four. This chapter marks the first of two which take the genealogy of influences mapped out in Chapter Four and focus in on a key practitioner within this network – in this case, Neal White – to situate them among their work, audiences and practices. Set against the backdrop of experimental geographies from Chapter One along with these influences, I explore how the OOE use artistic experiments to critique different aspects of science and technology.

Throughout this chapter, I pick up the theme of relationships to site which White draws on to frame how this relationship helps influence how individuals might perceive of science. For White, the perception of science by *non-scientists* is as important in constituting what science is as the perception of science by scientists. He seeks to mobilise and inform imagination and thus perception by experimenting with site to see how changing experience and information might alter the way individuals perceive of science, and therefore science itself. In this way, he adds the *social context* of experiments to the historically scientific practice to highlight the social imaginary of institutions and critique different aspects of science and technology. Consequently, the institutions White is interested in all relate to science and/or technology. Further, much of White's work is about tensions and critiquing narrow distinctions which, for him, relate to imaginaries and perception. So with this in mind, I highlight these tensions where appropriate and state what I regard each term to mean in the given context only.

To explore White's practice, I attend to a key facet of White's work being based on the experiential by drawing on my field notebook entries. These entries document my experience of a recent Neal White project titled *Sites of Excavation and Construction*, an exhibition running at Objectif Exhibitions in Antwerp from November 2015 to January 2016. It was commissioned by Objectif's Director, Antony Hudek,

and gathered additional expertise from Irish artist Tina O'Connell. Recounting my experience of *Sites of Excavation and Construction*, I proceed through the exhibition, stopping at key objects and installations which relate to themes of OOE projects, which I then discuss.

There are four key OOE projects I discuss which highlight a different relationship to sites. In *Dark Places*, White uses a virtual site to encourage visitors to speak back to him; in *Truth Serum*, he used a non-scientific space to experiment outside of a laboratory; in *The Void* he *changed* the site of experimentation by using a non-scientific space which he brought visitors *to* in order to witness an experiment that would historically have been behind closed doors; and in the *Secrecy and Technology* bus tour, he used multiple sites to *expand* the sites of experimentation, to include sites participants might not have perceived as experimental.

By engaging with sites in different ways, I argue White experiments with the social imaginary of science in these projects. He uses sites to alter the way visitors and participants *perceive* of key facets of science. I draw on the tension between the experiential[201] and the informational[202] which the OOE seek to explore throughout these projects, highlighting how this tension informs how visitors and participants *perceive* of scientific processes.

Given this focus on perception, each of these projects have elements of social practice in them, emphasising participants' roles in these artworks to question forms of knowledge. White uses artistic practice as research which underlies his parallel institution to engage with the fourth wave of institutional critique, and to prompt reflection on positioning artworks beyond simply objects or installations, but as (experimental) works of knowledge (White, 2014), contributing towards producing new forms of knowledge.

[201] That is, what visitors and participants *experience* at these sites

[202] That is, what visitors and participants *know* or are *told* about these sites.

Figure 14 – Welcome[203]

5.1. Participating

The familiar orangey-red industrial kiosk (in Figure 14) sits in a courtyard in front of the right-sided window of two floor-to-ceiling windows. I'm here to research White's Sites of Excavation and Construction exhibition, curated by the gallery's Director, Antony Hudek. White's signature kiosk confirms I'm in the right place. To the kiosk's right is a garage door partially lifted up. Under this garage door a luminescent orange glow pours out, glancing off the asphalt as it comes. To the kiosk's left and behind it, two large floor-to-ceiling windows are illuminated with a yellow-blue hue pouring from its lights inside. Left of these two intimidating windows is a narrow, tall glass and wooden door nestled in the corner, seemingly Objectif's main entrance.

Where do I start? There are three possible entry points. The door to the left looks like Objectif's 'main' entrance, the kiosk appears like it's simply a large plastic box and therefore not leading anywhere, and the garage door feels deviant, almost like I'd be breaking in by ducking under there. Surely the door is the only logical entry? But if

[203] Source: http://www.nealwhite.org/.

so, why is the kiosk door open? And why is the garage door partially lifted? Each of these three options represents an entry point for me, any of which I can choose. Where I choose to start alters the experience I will have of the exhibition, setting expectations for the rest of the exhibition. But I don't know the exact contents of the exhibition. The 'main' entrance looks the least exciting. I'm not going in there. It's between the other two for me. I take a venture into the unknown, driven only by curiosity. Kiosk, you're up.

This opening choice gives autonomy to, but also produces uncertainty for, the visitors. They can choose where to start the self-guided exhibition, if to start it at all. They are not obliged to do anything. Which entry do they take? Why? Some options are clearly unconventional, suggesting particular ways of perceiving art projects. "The first bit is just this introduction to this kind of abstract thinking," (White, 4th interview, 29/07/2015), White remarks, and "people can begin to sort of make sense of some of the very abstract" (White, 4th interview, 29/07/2015). Here, White hints at how this opening choice is designed to prompt participants to think abstractly about their current position and about the exhibition as they encounter it, to make sense of what they will experience. Thus, this is an opportunity for White to explore their perception as well as their physical choice. Where does this art project look like it *should* start?

White frequently engages with ways to encourage visitor participation, seeing it as crucial in provoking participant perceptions of the project's focus. A common way he does this is through social practice. One such example was the *Dark Places* project[204] in 2009, which examined 'how artists are evolving strategies for art as a form of knowledge production, challenging accepted patterns in contemporary culture and society' (Arts Catalyst, 2017: n.p.). The project was to produce new knowledge about existing sites, through artistic practice as research. *Dark Places* involved researching secretive sites and organisations around southern England[205] which had limited information publicly accessible. Many of these sites were scientific

[204] *Dark Places* was one of 12 outputs of the Office of Experiments' much larger *Overt Research Project*.

[205] Sites included Qinetiq branches, Porton Down (DSTL), Lulworth Military Range, Hanslope Park, GCHQ, and others.

or governmental organisations which the OOE used their "dark sensibilities and […] a critical eye […] [to] point to the construction of scientific research as one which shares intimate links with some of the more sinister aspects of government, security organisations etc" (White, interview in Debatty, 2012). White elaborates on the project's goals:

> "…much of the way in which we experience the world is shaped and informed by media, including online sharing of photographic imagery of remote, interesting, derelict or even secret places – or artwork in exhibitions. The staff at the sites we focus on are of course also aware of this and so use the media to project the official story of a site, or not. We visit the sites as this information about them often frequently does not add up or we have information about them unofficially which we want to explore" (White, interview in Debatty, 2012).

The OOE, then, acknowledges the artworks' role in shaping media consumed by individuals. For White, artists can use their works to ask difficult questions that other institutions might seek to *answer* rather than *question*, such as science. White states "the problem with science is that it believes it can solve problems. Artists make no such claims. But [artists] also might make a claim that science is wrong in it believes [sic] it can solve problems" (White, 2nd interview, 16/01/2015). *Dark Places* sought to explore *questions* around secrecy and the institutions underpinning knowledge production by making a "link between the worlds [individuals] inhabit – informational and experiential" (White, interview in Debatty, 2012). The OOE, then, sought to question the relationship between *information* mediated to individuals and what they *experience*.

Dark Places had two parts to it. One was an exhibition based at the John Hansard Gallery in Southampton, and the other was an online open access database titled *A Field Users Guide to Dark Places – South Edition* mapping and recording 'advanced labs and facilities that are unwittingly – or purposefully – concealed from public view' (Arts Catalyst, 2017: n.p.). The exhibition was for a limited time period and offered a glimpse into secretive organisations. Visitor interest sparked from the exhibition could be followed up by exploring the 24/7, open access database. The database

was something akin to CLUI's *LUDB* – albeit with a different focus – taking influence from CLUI:

> "…when I started doing the stuff with CLUI and started working with Steve [Rowell], […] we were going around looking at all the *Dark Places* research. So his influence is really on the ground doing methodologically, working with him, […] finding out how they, CLUI, do their stuff, [and] talking to him" (White, 1st interview, 19/12/2014).

Anyone with internet access could use the online database, and the exhibition contained a computer set up with the *A Field Users Guide to Dark Places – South Edition* online guide for users to peruse.

Figure 15 – The kiosk housing A Field Users Guide to Dark Places – South Edition[206]

Crucially, the database could also be *added* to, either by gallery visitors or remotely over the internet. Theoretically, anybody with internet access could add to it. However, the OOE introduced a requirement, White stating:

[206] Source: http://we-make-money-not-art.com/the_office_of_experiments/.

> "…if you want to add to our database, or undertake Overt Research [as part of the *ORP*], we insist that you must first participate physically by joining us on one of our research fieldtrips to learn more about what we do and how we do it" (White, interview in Debatty, 2012).

In the *Dark Places* exhibition, the orangey-red kiosk housed the computer set up with the *A Field Users Guide to Dark Places – South Edition* online database. The kiosk gave accepted users the opportunity to decide what they wanted to *upload* to the database, and what to *keep*. Information could be added, altered, or removed, along with images, directions, and co-ordinates. Users decided. On the one hand, users could only upload information if they had experienced sites with the OOE, requiring the experiential for the informational. But on the other, anyone with internet access could use an entry's co-ordinates information to go and explore the site for themselves experientially, requiring the informational for the experiential. The OOE therefore explored the relationship between the informational and experiential, but so too did users through social practice. *Dark Places* highlighted how institutions can be re-conceived both informationally and experientially, in light of new information or new experiences. By housing *A Field Users Guide to Dark Places – South Edition* the kiosk in *Dark Places*, then, represented a way of understanding the complex relationship between the work these organisations do, and how they are perceived in the public realm, as expressed informationally and experientially.

5.1.1. Entering and leaving participatory spaces

But, back in Antwerp, this isn't Dark Places. It's Sites of Excavation and Construction. Undoubtedly the kiosk's role is different. In the courtyard, the kiosk stands squarely in front of me, staring me down as I approach. Not about to blink first, I take on the kiosk. The door to it is open. 'You're on, kiosk. You're on', I think to myself. I take the bait my intrigue has cast before me. The kiosk's insides await me.

Bare and white with unusual eclectic patterns between the plastic and its overlain paintwork, the kiosk's internal simplicity is oddly intriguing. But before I can step in, I notice a large hole in the kiosk's floor, with the top step of a ladder protruding

through it. How is a ladder going through the ground and where does it lead? I hear a noticeable humming sound gradually increase and decrease in volume, a gentle crescendo and then diminuendo. Enticing me in, I take to the ladder for a closer look. Twisting my body, I descend the ladder to arrive in Objectif's basement.

Once down the ladder, I become absorbed in the basement's sights and sounds. I become gradually less aware I have entered the kiosk, this awareness steadily blending into background of my mind. Am I still in the kiosk at all? Where does it end? Surrounding me on three sides is differing shades of beige and brown rock, with fine rubble between the under-side of the ladder and one of the walls.

In *Sites of Excavation and Construction*, the kiosk's role is multi-faceted.[207] It is an entry point to the fleeting, temporary institutions White seeks to create. But it is more, and shares similarities with the Center for PostNatural History – explored next chapter – through its physicality. It is a space. It has walls, windows, a roof and a door. It is enclosed and confined but also transitory, people moving between spaces through its door and windows. All just like the CPNH. But the kiosk is different. Its fleeting existence is experimental.[208]

White uses the kiosk to confront key spatial questions about institutions, such as how individuals enter an institution. Are visitors still in the kiosk when they descend down the ladder? How about when they are at the far end of the basement? Having entered through the kiosk, at what point does this change? Are you still 'in' the kiosk when you leave it if you take the exhibition's ideas with you? Crucially, once entered, can participants ever really *leave* the kiosk?

[207] White uses the kiosk in several of his projects. Sometimes its purpose in one project overlaps with another, but I do not intend to insinuate all purposes of the kiosk are the same in each project, because it doesn't. It serves a different purpose in each project.

[208] Banfield (2016) outlines an alternative understanding of experimentation, involving a using materials and methods. For her, it can be "defined as discovering the outcome of manipulating materials and methods and as a means of gaining new ways of thinking and perceiving" (2016: n.p.; see also Mace and Ward, 2002). At this juncture I argue the kiosk is a material being manipulated, as well as a method used to generate new questions around the arrangement of space and the inside/outside boundaries.

These are key for White's conceptions of instituting,[209] highlighting the spatiality of these in/out thresholds. Institutions are seen by Trevor Paglen to be spatial at their essence, arguing '[t]he spaces humans produce, in turn, set powerful constraints upon subsequent activity' (Paglen, 2009b: n.p.). For Paglen, once physical parameters are set, successive social or physical parameters are based on these in future. Rheinberger argues a similar relationship in his 'experimental system' (1997), one method used in the biological sciences. He gives the example of 'technical objects' which are the established tools and their protocols from previous experiments forming the experiment's apparatus.

However, as Paglen (2009b) highlights, there is a relationship between the spatial and the social. The experiment's tools and protocols have been standardised by people, and embody the social relations dictating their use. But they also are enacted in a space, such as the laboratory (Thrift et al., 1995). Spatiality, then, also has a social dimension to it, with protocols and expectations in those spaces set by social relations. Subsequently, both space and the relations influence how institutions come to be socially constituted and maintained.

White highlights how the in/out threshold of institutions he alludes to in the kiosk occurred in the history of science. Socially, as science became increasingly accepted from the Age of Reason to the Age of Enlightenment, it was prominent and controversial in society, dividing social opinion against religion (Shapin and Schaffer, 2011). It bore a difference to what went before, so stood out against the norm. As with any new practice, science required conscious thought to internalise, but as it became increasingly accepted, it begun to fade into the background.[210] Once its validity was increasingly confirmed, it became routinized and easy to forget how accepted it had become, just like the kiosk in *Sites of Excavation and*

[209] By 'instituting', I refer to the *process* of creating and maintaining an institution. I use 'instituting' to relate to how an institution gets created, and to differentiate from 'institutionalising' which, I argue, relates more to the process of accepting the institution in wider society.

[210] For further exploration of how institutions are first noticed when they are brought into being, see May and Finch (2009).

Construction.[211] Fading into the background however, solidifies the institution's role in society, becoming habitualised, re-enacted automatically and accordingly unnoticed.[212]

For White, though science has never been without debate, he critiques science, responding to Husserl's call (in Rheinberger, 2008) over the lack of critique scientists had done on science, despite its rigorous critique of other worldviews. Science had not been thoroughly critiqued with the same rigour in a substantial amount of time (Husserl, in Rheinberger, 2008). Foucault suggests a potential reason why institutions might evade critique, arguing the quotidian practices symptomatic of institutions become so ingrained they are hard to notice[213] (Foucault, 1980a; 1980b; see also Philo and Parr, 2000). Mills sums up Foucault's ideas on this, writing:

> 'These disciplinary norms within Western cultures are not necessarily experienced as originating from institutions, so thoroughly have they been internalised by individuals. Indeed, so innate and 'natural' do these practices appear that we find it hard to conceptualise what life would be like without this constant checking of appetites and whims' (Mills, 2003: 43-4).

So in the scientific context, as scientific practices are re-enacted, science is re-constituted, individuals' actions towards it confirming its protocols and practices.[214]

---

[211] This is not to assume that science has always been universally accepted or has reached social acceptance without debate and contention. Science's history is riddled with confrontation, critique, debate, and ridicule, but in spite of these, it has become the chief validator of knowledge in 21st Century Western society. In this way, its practices and procedures no longer have to be learnt in the same way as they once did. Instead, these practices and procedures have become internalised in society and the process of conducting a scientific investigation is commonly accepted.

[212] Berk and Galvan (2009) make a similar point in their work on creative syncretism; Dewey's (2002 [1922]) oft-revered work on conduct also expresses similar sentiment.

[213] Foucault argues this about institutions but does not explicitly mention science. He addresses institutions broadly, and does so through notions of power.

[214] A good example of how institutions, through re-enactment, can become routinized and their protocols accepted, is through language. Austin (1975) highlights how uttering certain phrases in 'performative utterances' entail particular expected responses and actions, such as "I declare war", while 'illocutionary acts', such as "is there a spoon?" rather than "may I have a spoon?" can change the meaning of a word depending on its context. For further exploration of language through temporality, see Derrida (1976).

White draws on this relationship between re-enactment and institutions to question the process of instituting. How does one come to enter or create any new institution? And if one wanted to leave it, *how* could this be done, if at all? In using the kiosk to ask these questions, White gestures to a spatiality of thresholds, a *physical location* to a *conceptual* threshold. Giorgio Agamben (2005) considers this spatiality of thresholds through his 'state of exceptions'. He considers thresholds by way of determining the conceptual inside/outside point. Discussed in reference to his 'state of exceptions',[215] his consideration of thresholds is pertinent:

> 'The simple topographical opposition (inside/outside) implicit in these theories [on the state of exceptions] seems insufficient to account for the phenomenon that it should explain […]. In truth, […] it concerns precisely a threshold, or a zone of indifference, where inside and outside do not exclude each other but rather blur with each other' (Agamben, 2005: 23).

For Agamben, thresholds are interfaces[216] where the inside and outside converge in a blurring at the 'zone of indifference' (Agamben, 2005: 23). They are therefore not clear-cut binary divisions, but instead represent a complex unfolding of gradual change in circumstance, action and thought. This unfolding can, according to Llewelyn (1986), highlight thresholds' role as a boundary of sense or sensibility. White, then, suggests a similar approach to Agamben, highlighting the complexities of institutions, both spatially and conceptually, complicating ideas around how and/or when one can enter or leave them. In these complexities, thresholds can represent a boundary of sense or sensibility (Llewelyn, 1986) beyond which represents a venture into the unknown, a venture which White and his kiosk experiment with.

Furthermore, White also uses the kiosk to experiment with institutions' temporality. Shipped to Antwerp, the kiosk arrived flat-packed. Over just a couple of hours, it transformed from being a stack of industrial plastic involved *in* the landscape of Objectif's courtyard to seeking to be distinct *from* it, eye-catching amongst its surroundings. The orangey-red colour enveloping its exterior shell is distinct and

[215] Agamben (2005) uses the 'state of exceptions' to refer to when a government increases its power in declared emergencies.

[216] For work on interfaces, see Forsyth et al. (2011) as well as Tolia-Kelly (2013) on surfaces.

alluring, inviting individuals in. Moreover, occupying this spot in the courtyard has also only been temporary, arriving weeks before the show's opening. Despite its appearance of permanence when erected, it is a fleeting, *temporary* structure both in form – by way of construction from flat-pack to dwelling – and function, appearing at different sites for different projects of White's. It celebrates its transience through its mobility.

Such temporary institutions imbue White's connection of the social with spatiality, and he relates these to temporality. The kiosk goes from an innocuous industrial plastic stack to a constructed institution potentially at any physical location. It can be built in two hours and gone in another two. However there's no reason this could not be a permanent institution. As with any institution, as explored later, belief in their characteristics dictates social decorum around their existence. They *become* permanent because they're believed to be. In experimenting with sites through these temporary institutions, it shows they are precisely that, *temporary* institutions. Institutions are not immutable and can be changed, potentially at any given time and point. For White, this is a question of social imaginary, as he highlights in his example of science:

> "…scientists can't control [opinions on science] and they think they can because everything else they control. […] What I believe in is they need to understand that what […] people are saying is to some extent true of science. So science *is* all these other things that it doesn't want to be because that is how it exists in people's minds. In the social imaginary, that is what science is. […] In the research that I'm interested in doing, that area is as valid as science itself" (White, 2nd interview, 16/01/2015).

For White, then, what others perceive of science is as valid as what science perceives of itself. The division between being inside and outside an institution then becomes further blurred and unclear, conflating the social and the spatial. White uses the kiosk's transience to highlight the complex notion of institutions by experimenting with the spatial and the social in the kiosk, stating "it represents the […] research office of a live project that's still going" (White, interview in JHG, 2012).

This transience of the kiosk in *Sites of Excavation and Construction* and its social practice use in *Dark Places* relates to a wave of what Claire Doherty (2004) terms 'New Institutionalism'. She identifies several key characteristics of New Institutionalism, including encounters becoming more temporary and fleeting, open-ended, and in situations of flux. In New Institutionalism, artworks focus on conversation and social practice as embodying open-endedness and situations of flux, encouraging participation rather than passive consumption of displays. Fleeting encounters, open-endedness and situations of flux sought by New Institutionalist artists act as *starting points* of the artworks and for visitors, rather than offering something conclusive to depart the space with. New Institutionalism, then, invokes social practice, participants becoming an active agent in artworks and deciding how to explore ideas further off-site. In this way, the kiosk relates to New Institutionalism, participants choosing how to interact with it in a decision which shapes their engagement with the project.

White, then, uses the kiosk to experiment with complex questions around the social and spatial aspects of institutions. In *Sites of Excavation and Construction*, these questions are approached by erecting a temporary institutional space in the courtyard of an established institution like *Objectif Exhibitions* in Antwerp, with participants seamlessly[217] moving between the two via the underground basement. Where does the temporary institution cease and the established one commence? What is the difference between the temporary and the established in this context? However, White also juxtaposes both the temporary and the established institutions. The temporary kiosk can be encountered and erected anywhere and for an indeterminate period of time, reflecting how individuals can encounter and enter institutions anywhere, at any time, and for an indeterminate period of time. Like institutions, in *Sites of Excavation and Construction* the kiosk does not have a fixed exit point and blurs into the established *Objectif*, highlighting how easily the temporary can become established, fade into the background once entered, and subsequently difficult to leave. The appearance of the striking orangey-red kiosk in such a peculiar space, then, draws attention to the ways institutions can be

[217] Here White creates a tension between the hesitancy of making a decision and the seamless movement once in the basement.

conceived of in different ways relating to their physical, material construction and perception.

5.2. Re-siting materials

Standing at the ladder's base, all in front of me is dim and gloomy. But for one exception. A narrow band of bright light has wrapped itself around a table-top. The table sits at an angle in the middle towards the back of the basement between a row of pillars, with two objects placed atop too far away to make out.

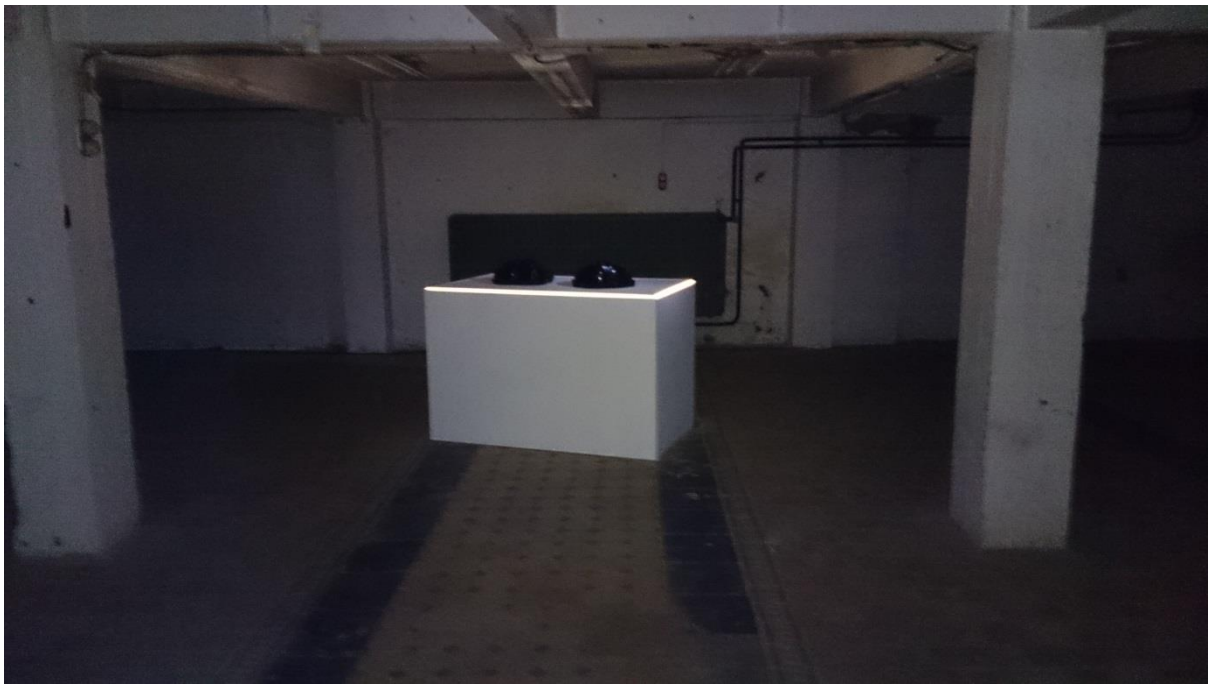

Figure 16 – Absence and presence[218]

Approaching this mysterious table, the ground texture underfoot changes from the beige-coloured rock to small tiles now lining the basement's base. The audio crescendos as I approach the table, almost booming in a deep, resounding tone pulsing and reverberating through my organs. The audio is translated from seismic data to resonant frequencies by artist, programmer and composer Anna Troisi, an Associate of White's Office of Experiments. It highlights just how deep, in both

[218] Source: author's photograph.

metaphorical and physical terms, the impacts of the institution White is critiquing in this project – the diamond industry – can extend.

The illumination of this single table punctuates the dim and damp atmosphere. A pristine white at waist height with a powerful, blue-LED light shining on it greets me. Two large black sculptures sit atop. One of them resembles an inversion of the Diavik diamond mine, the other an inversion of the Rio Tinto diamond mine.

Figure 17 – Bitumen mines after setting[219]

However where these mines are chasms carved into the Earth's bare rock, these sculptures are built upwards. Their largest circumferential shelf is at their bases. When built upwards rather than into the ground, it strikes me just how enormous they are. These sculptures are crafted from bitumen, a by-product in the production of crude oil, giving them a black gloss. Bitumen comes from the deep Earth just like diamonds, and represents the excessive resource extraction both the fossil fuel and diamond industries promote.

[219] Source: author's photograph.

Figure 18 – Bitumen 'mines' up close[220]

I see a band of light piercing through a narrow slit between the table and the table top. Peeking through it, I see two medium-density fibreboard casts of the two mines. As the bitumen warms to room temperature and gradually melts, the sculptures will slowly move through a hole in the table-top, its viscosity clinging it to the wood on its way down.

A flashback envelopes me. A last-minute struggle between White and O'Connell to get the solid, cooled bitumen freed from its cast without it splitting. The process takes multiple hours, tools, beads of sweat and curse words. Eventually it comes free, only to be hastily rushed into the refrigerator, the energy invested in breaking it from its cast raising its temperature dangerously high.

[220] Source: author's photograph.

Figure 19 – Last minute exhibition preparation[221]

While the bitumen cools, a crucial decision is made about the hole size in the table top. Too small and the bitumen with its low viscosity would clog and solidify in the hole. Too large and it would go through too quickly, leaving too little time to cling to the wood as it sets.

[221] Source: author's photograph.

Figure 20 – Bitumen in transit[222]

Back in the present and White's solutions have worked perfectly, carefully folding together concept and material. As the bitumen oozed through the hole, the mines' physical forms would be reflected in the bitumen sculptures on the top, yet re-embody the inverse below on the wooden sculptures. It would reveal the sheer size of the mines more readily when appearing above ground level than beneath it.

Here, White uses bitumen to represent using an unusual *material* in an artistic space as part of expanding the spaces of art and how they are used. He is drawing on different materials to question *what* can be experienced in an art space, and what materials artists can use. For White, this relates to Krauss's 'expanded field' argument, which, for him, relates to expanding the ways art can be produced and experienced and therefore includes questions of materiality.

In returning to Krauss's 'expanded field', White combined using unusual materials alongside an expansion of artistic spaces for the OOE's 2008-9 *Truth Serum* project,

[222] Source: http://www.nealwhite.org/.

which involved using so-called 'truth serums', notably Scopolamine,[223] in a space not traditionally associated with art. In *Truth Serum*, White collaborated with the historian of science and anthropologist Nicolas Langlitz from the Max Planck Institute to investigate the historical use of truth serums. It took the experimental science of administering truth serums in the mid-20th Century by the CIA in particular, and altered its site by doing so outside a laboratory.

And, like *Sites of Excavation and Construction*'s use of the basement, *Truth Serum* involved taking art to a non-traditional art site.[224] In this way, like the kiosk in *Sites of Excavation and Construction*'s, *Truth Serum* represented using a 'temporary, off-site' (FACT, 2017) space to experientially engage with this fleeting encounter. The project was set up in direct response to the Steve Kurtz trial I highlighted in Chapter Four which was ongoing at the time.[225] White stated: '[t]o mark Kurtz's outrageous arrest I devised the work 'Truth Serum' in 2008 in order to underline the creep of the security complex into the nervous system of society' (White, 2014: 111).

The project used a hidden URL at the Foundation for Art and Creative Technology (FACT) in Liverpool[226] to gather interested participants, who were emailed simple instructions including a meeting time, place and date. Once at the meeting place, they met a visually-obscured,[227] wig-wearing mysterious figure named Randy who symbolised fear and irrationality, being played by several individuals under the same identity (White, 2014). Informed they were trialling truth serums, participants could choose one of two groups: the 'Vino Vertias', and the placebo group. They were informed a third group would be tested using Scopolamine, a former FBI and CIA truth serum. Participants were then abducted, driven to a secret location and were not told where they were going.

---

[223] Scopolamine was one of the first major barbiturates considered to be an 'extractor of truth' (Winter, 2005). See Winter (2005) and Calkins (2010) for a more comprehensive overview of Scopolamine's history as a truth serum.

[224] This non-traditional art site in question was 'in a disused warehouse in Liverpool' (OOE, 2017: n.p.).

[225] Part of *Truth Serum*'s devising was down to White's professional relationship with Critical Art Ensemble (CAE) who he had worked with on *CleanRooms* in 2002-3, and part was related to his personal friendship with Kurtz.

[226] The project was run at FACT in 2008, before being commissioned at CFCA, Luxembourg, in 2009.

[227] Randy wore an enormous wig which obscured his entire head.

Figure 21 – Part of Truth Serum's staging[228]

At their destination, participants were greeted with waiver forms requiring signatures before having long waits in several waiting rooms. When called through, some participants were given a shot of vodka to drink, others a plaster to wear, while members of the third group were administered Scopolamine. Once experimented on, participants were sat in front of a monitor and told they had to answer a series of questions against the clock to test for truth levels. The monitor then went through a series of questions[229] which the participant had to either answer 'true' or 'false' to using associated buttons. 'The techniques appeared as psychological warfare, entering into spaces of fear, using scientific methods. No data was produced, the participants released bemused onto the street with no directions home' (White, 2011: n.p.).

For White,

[228] Source: http://www.o-o-e.org/exp-truth.html.

[229] Topics of questions included but were not limited to art and its role in society; whether participants feel comfortable lying, and if so to whom; a tension between linguistics and observation played out through colours, such as asking if 'blue' was a colour or a word; and whether they'd visited any of the places shown in a collage, and then if they'd *knowingly* visited any of the places shown.

> ‘*Truth Serum* [transgressed] the normative limits of institutional space, in having to be made outside of the enclosure of a research space. […] [It] exceeded the limits of the academic and institutional sites, challenging the controls set up within the laboratory’ (White, 2014: 46).

A significant part of *Truth Serum*, then, was its re-siting. By choosing to take a traditionally scientific experimental practice like the administering of truth serums out of the laboratory ‘controls’, White questioned the relationship between site and authority. Who is allowed to experiment in a laboratory? Is this different to outside a laboratory setting, and if so, why?

When devising *Truth Serum*, White considered inverting this relationship in discussion with Langlitz:

> “I was doing a lot of talking to Nicolas Langlitz and we were talking about […] the use of labs [during the Cold War] for maybe non-legal purposes, and there’s lots of scientists doing stuff and getting and taking LSD, and sitting in suspension – what are they called? Sensory deprivation chambers – and doing research on perception and cognition. And they’re not supposed to be doing it, but they are all. They’re doing it, he’s researched a lot of this stuff that’s going on in labs, and so it’s all this stuff that’s happening and nobody talks about it and people know it’s going on” (White, 2nd interview, 16/01/2015).

In White’s discussion with Langlitz, they consider how experiments with truth serums in the 1950s and 60s involved scientists using an authoritative space like a laboratory in a way now considered irresponsible. The site of the laboratory provided an institutional protection for experimenting afforded only to scientists, legitimising experiments non-scientists would not be granted ethical approval to conduct in a laboratory or non-laboratory space.

The relationship between site and authority in experiments is evident in Rheinberger’s (1997) ‘experimental system’, which White draws from:

> "I also met Rheinberger at the same time and when he talks about technical apparatus and experiments […] this is really why Office of Experiments is called that […]. He refers to experiments as the unfolding of unexpected events […]. So you've got Rheinberger's analysis of the technical, social apparatus, the power, the funding […] and the epistemic things are those things which aren't the theories that you prove or unprove, but they're the techniques which you learn. […] Whether or not, you prove something the most important [thing is the] epistemic thing; the most important bit of knowledge is that bit of knowledge" (White, 2nd interview, 16/01/2015).

For White, the site and authority legitimation in experiments comes from the technical apparatus, which are the scientific protocols passed down from experiment to experiment as the standard, accepted procedures for launching an experiment. This technical apparatus represent the tools to find out about the epistemic thing, and therefore govern the framework the epistemic thing is produced in. In seeking to produce art as a piece of knowledge, White aims to disrupt this, altering the technical objects to those outside of the accepted scientific protocol to produce new forms of epistemic things.

In *Truth Serum*, he alters both the site of the experiment and the authority for experimentation by choosing a non-traditional scientific space. In doing so, he highlights how experiments can be conducted by non-scientists in spaces not confined to the laboratory. Further, rather than just non-scientists conducting experiments, specifically *artists* can experiment, and using a space not traditionally associated with art as well as science, White adds further weight to legitimising artistic practice as contributing to new forms of epistemic things, and therefore knowledge.

Here, White is also highlighting the social imaginary of science by openly questioning science's trust. For White, *Truth Serum* reminds participants of science's questionable knowledge sharing between the military, industry, and academia, often

accelerated and granted further powers in times of war.[230] Yet in being perceived as the contemporary validator of knowledge, science's political, industrial, and military alliances can almost be seen as ignored, or worse, vindicated given its contemporary status.

Many projects by artists have highlighted how problematic some of these alliances have been,[231] and for White, as well as for Rheinberger (2008), science's history is embedded in current science. Contemporary science, and most importantly for White and Rheinberger the experimental system, involves 'the language of an experimental system whose history it contains' (Rheinberger, 2008: 185). And as the history of science has been riddled with 'directed research' (Smellie, 2009) governed by problematic alliances between politics, industry, and the military (see MacLeod, 2001), White highlights the perspective of those used as necessary collateral in the pursuit of these directed scientific advances often for military or political gain. As a de-classified document from the CIA's repository on truth serums highlights, military success can be seen to justify any scientific action: 'Any technique that promises an increment of success in extracting information from an uncompliant source is *ipso facto* of interest in intelligence operations' (Bimmerle, 2008: n.p. [original emphasis]). Therefore, to avoid a public acceptance of scientific advances developed under such conditions or being seen as vindication for the methods used in making the advances, White used motivation from the Kurtz case to showcase the perspective of those persecuted or experimented on by this same, problematic alliance.

In Kurtz's case, he was persecuted for being a threat to the established, problematic alliances by possessing harmless bacteria for an upcoming art project. Suspicious of CAE's previous work using controversial but legal biological substances, authorities acted to impeach Kurtz to deter other non-scientists using biological material. As Chapter Four showed, the authorities believed in a very narrow distribution of expertise relating to science, a belief which has shown to be ineffectual at producing

[230] MacLeod (2001) argues a 'military-academic-industrial complex'(2001: 316) was commonplace during the mid-20th Century, giving an example of science and the military's overlap in the Smithsonian's Ocean Biological Survey Program from 1963 to 1970.

[231] An OOE project, *The Mike Kenner Archive*, is one example, taking private researcher Mike Kenner's work into the non-consensual chemical tests on unwitting British citizens over southern counties during the Cold War, as well as Porton Down's experiments on service men and women.

'socially robust knowledge'[232] (Nowotny, 2003; 1999) which has more social applications, is context-dependent, and therefore requires an expanded distribution of expertise. By removing the institutional setting of a laboratory and using a non-scientific space, *Truth Serum* was an opportunity to highlight how the scientific process has been performed by scientists previously, showing at once the flaws in the scientific process, and how non-scientists are capable of performing scientific procedures. For White, often terming something as 'science' can act as a cloak to mask over otherwise problematic procedures, and therefore instead of persecuting those who highlight this – like Kurtz – science should be critiqued. *Truth Serum*, then, was an example of scientific knowledge being applied outside the traditional spaces of science, which White sought to use to experiment with the social imaginary. How might perceptions of science change when firstly participants are made aware of where its knowledge comes from, and secondly participants *experience* the reality of such scientific experiments?

Truth Serum also confronts the temporal fragility of scientific experiments. Truth serums' emergence and propagation during World War II until the mid-20th Century were investigated by the CIA in key investigations, such as Project MKUltra (Arrigo, 2000; Victorian, 1999).[233] These investigations were wide-ranging and spanned several years, before concluding truth serums were inconsistent and unreliable, despite their widespread use only years earlier. This highlights experiments' temporal dependence and context; previously considered cutting-edge and since rendered inaccurate. Further, the same scientific framework which produced truth serums as a credible tool during World War Two was then used to denounce them as inconsistent and unreliable only years later. This represents an implicit critique in assumptions about how scientific knowledge is advanced and accumulated which

[232] Nowotny (1999) outlines 'socially robust knowledge' as relating to a more context-specific understanding of science with more social benefits than abstract, unapplied notions. Nowotny sums up her argument for socially robust knowledge, stating: 'the authority of science becomes more closely tied to concrete practices, their results and impact. Reliable knowledge […] will be tested not in the abstract, but under very concrete and local circumstances. […] Problems are no longer confined within disciplinary boundaries and increasingly knowledge is produced in the context of applications. […] A fresh view on this diversity is not only part of the social reality, but also a strength to be exploited' (Nowotny, 1999: 14-15).

[233] Project MKUltra was a project run by the CIA on human experiments to research the possibilities for mind control.

Jasanoff firstly debunks and secondly highlights science's response to pressures not necessarily leading to benign advances:

> 'Scientific knowledge, it is now widely accepted, does not simply accumulate, nor does technology invariably advance benign human interests. Changes in both happen within social parameters that have already been laid down, often long in advance' (Jasanoff, 2005: 13).[234]

As Jasanoff argues, scientific knowledge is not an accumulation process, and nor is it – or its use in conjunction with technology – benign. The 'social parameters' she refers to set the confines which science operates within. Such social confines by their definition change over time with social and cultural desires, requirements, and purposes, making the results temporally dependent. Often further research confuses or contradicts previous claims, which, for White, reinforces the temporal link between science and experiments' temporal dependence.

Truth Serum shows how the historical practices of science have been problematic, and belief that they were, at the time, cutting-edge serves as an insight into the political fears of the time. As Langlitz remarks, '[h]istorically the truths which truth serums disclosed might have revealed more about the times and cultures fostering them than about the secrets of the subjects they were given to' (Langlitz, 2007: 124). These political fears, then, were reflected in the science of the time, with widespread use of truth serums devised and experimented with as part of alliances between science and other industries.

For White this highlights the flawed perception of science having a narrow distribution of expertise, showing how these sectors and industries have historically overlapped involving non-scientific practitioners. Accordingly, taking such a 'closed system' experiment *perceived* of as exclusively scientific[235] in a scientific space and using it by non-scientists for an artwork in a non-scientific space was the OOE's attempt to regain autonomy to perform experiments. This picked up from the narrow distribution of expertise which Kurtz had been making a project about using harmless

[234] See Kitcher (2001) and Hacking (1999) for further consideration of science in social contexts.

[235] See Locke (2002) for an overview of how science can be perceived in the public realm.

bacteria when he was arrested. *Truth Serum*, then, sought to reconceive science in the social imaginary by reminding participants of science's protocols despite its chequered history, while arguing against the narrow distribution of expertise permitted to perform experiments.

To rally against the belief that artists who could conduct scientific experiments were dangerous – and White believed Kurtz's case demonstrated this belief – the OOE made a threat in *Truth Serum*, which Langlitz (2007) summarises. He states that '[d]isguised as a dark clown, the anonymous spokesman of a radical 'Bio Art' cell threatens that the self-experimentation unit of the Office of Experiments will conduct mass self-experimentation with truth drugs unless legal action against Steve Kurtz is discontinued immediately' (Langlitz, 2007: 118). The message here was simple: release Kurtz or the OOE will exercise its autonomy.

5.3. Socially experimenting

Departing from the table, I make my way across the basement floor and up a concrete staircase in the opposite corner of the basement. The staircase has a fluorescent yellow light shining down from above which is greedily snaffled by the dull, damp concrete steps. At the top of the steps I reach a room with two parts in it. The left part is a small confined through-room, while the right part is taken up with another concrete staircase leading up to a mysterious, dark area. Might it be part of the exhibition? How do I differentiate the parts involved from those not? In stark contrast to this dark and dingy-looking space up the steps, a bright orange light streams from a room in the far left corner of this through-room. I take a couple of steps up into the dinginess and conclude the orange light is more appealing. I trot back down the steps and approach the vibrant, orange space.

Entering, the change in hue hurts my eyes. It's a considerable rectangular space, much bigger than the yellow through-room, but it also has few installations in it. In fact, seemingly just one installation. A single large, A0-sized, poster with a Robert Smithson essay on it clings to the wall immediately on my right. Adjacently, wooden beams divide the wall into five segments. These beams divide these segments into

rectangles and have medium-density fibreboard overlays from the other side. It has been constructed purposefully for this exhibition, to re-arrange the space in the gallery. From the room's end by the poster to the garage shutter at the other end, I count the steps as I walk. End-to-end, it is 23 paces.

I turn to look at the Smithson poster. It transpires it's an essay about his work, Spiral Jetty:[236]

[236] I come on to *Spiral Jetty* in more detail shortly.

Figure 22 – Smithson's Spiral Jetty poster commands pride of place[237]

[237] Source: author's photograph.

Absorbing the poster, I attempt to take in all I've experience so far. And there is much to reflect on. What have I seen? How does it fit together? What does it all mean?

This reflection room has only Smithson's *Spiral Jetty* poster in it, positioned as its centrepiece. It is the essay accompanying his infamous *Spiral Jetty* land art sculpture, a 15ft wide coil which stretches off the shore at Rozel Point in the Great Salt Lake. Produced by Smithson in 1970, it encroaches 1500ft into the lake, made from a combination of basalt rock and earth from the site (UMFA, 2015). In producing *Spiral Jetty*, Smithson propagated a newly-emerging form of art known as land art.

Smithson was a key influence of White's, and this influence is paid homage to in *Sites of Excavation and Construction*. *Spiral Jetty*, arguably Smithson's most iconic work, draws on two key ideas which White links to and expands further on in different contexts. First, *Spiral Jetty* was an earthwork[238] and therefore exhibited in the landscape, and often created using materials from the works' site. By exhibiting in the landscape, *Spiral Jetty* was situated in the 'expanded field' (Krauss, 1979), 'beyond studio and gallery space' (Hawkins, 2013: 53), sited in a space outside the conventional artistic spaces. Second, *Spiral Jetty* was concerned with temporality, being sculpted to lead towards an eventual decay and re-use by the landscape, imbuing Smithson's fascination with entropy.[239] According to the Utah Museum of Fine Arts (UMFA), 'the close communion between *Spiral Jetty* and the super-saline Great Salt Lake emphasises the entropic processes of erosion and physical disorder with which Smithson was continually fascinated' (UMFA, 2015). As *Spiral Jetty* aged, its use, form, and relationship with the landscape would change, and as such people's experiences of it and how they valued it would do too. White draws from

[238] This was the colloquial term given to artworks produced in land art.

[239] This was closely aligned to his intrigue with the second law of thermodynamics around the concept of entropy in physics. Here, entropy corresponds to the state of energy within any given system. As energy is applied to the system, the bonds between the molecules break, increasing the disorder of the material. With enough energy, the material will change state from a solid to a liquid, once a particular amount of energy unique to the system is met. The second law states that in any cyclical process, the entropy of a particular system will either remain the same or will increase. Thus, it will progress from order to disorder.

and expands on both the expanded field of art and temporality aspects of *Spiral Jetty* but in a different context which sought to highlight the cultural value of artworks.

In 2005-6, the OOE sought to draw on both the expanded field of art and temporality in *The Void and the Self-experimenter,*[240] which applied these two aspects in a scientific context. The scientific context was crucial for White to confront what he sees as science's lack of interest in the cultural value of their own works. Accordingly, *The Void* was a 2005-6 recreation of Yves Klein's 1958 *Le Vide* project, whereby White isolated himself in a transparent inflatable chamber in the middle of the gallery space, complete with white face mask and white clothing. Here, he would be the 'man in white', the scientist figure so often feared as mysterious. In the chamber, White created harmless methylene blue pills and invited participants in the public gathering to ingest them. Through the chamber's small window White handed out the blue pills from his table in exchange for a coupon from the limited edition newspaper titled *The Self-experimenter*, and a participant's signature of consent. *The Self-experimenter* newspaper gave information about methylene blue's risks and possible side-effects, warning participants of its urine-staining properties for up to five days (Solhdju, 2006). Given tumblers of water when acquiring the pills, participants were free to do anything they wanted with the pill at any time, though the urine-staining properties only appeared 12 hours after consumption.

In *The Void*, White draws on the expanded field of art to question the sites of art. In 2004, White originally proposed *The Void* a research experiment to be hosted at the National Institute for Medical Research, where he was artist in residence (Triscott, 2012). As Gould outlines, White's proposal 'was not a maverick challenge to the future of medical science but a very present probe into the heavily regulated behaviours within the institute. […] [H]ere was a cultural experiment [whose] product could not be calculated, only observed and considered' (Gould, 2005: n.p.). However, his proposal was rejected on ethical grounds, and he instead had it exhibited in the Barbican[241] conservatory. Conversations on the committee had focused on the risks of doing such an artwork within a scientific space; to perform a

[240] *The Void and Self-experimenter* was the exhibition at the Barbican gallery the thesis' opening extract was reconstructed from.

[241] The Barbican, London, is a cultural conference venue, hosting several different cultural activities.

scientific experiment, in a scientific space, but without requiring the same level of scientific rigour. White's proposal's rejection was unsurprising, if disappointing, for him, stating *The Void* was constructed '…in a manner to question the ethical dimensions of art operating in the world of science[.] [T]he project invites the viewer to take [a] risk the institution cannot bare [sic]' (White, 2011: n.p.).

In *The Void*, then, White instead performed an *artistic* experiment with materials associated with scientific experiments in a space associated with cultural performances. This, he argues, is down to how science perceives of itself:

> "Science is *way* too controlling in its access, permission, and the knowledge it gives you or the knowledge it wants […]. Whereas you're not asking for that when you're engaging in art to the same extent – you might be in the conceptual development, critical, but you can have somebody who doesn't understand anything to do with nuclear science but still have a position on nuclear technology" (White, 2nd interview, 16/01/2015).

In *The Void*, he sought to question the sites of art and what could be done in art spaces.[242] Like Smithson did with *Spiral Jetty*, White experimented with the expectations of particular spaces, providing a form of art many visitors might not recognise in such a space but also one which scientists would reject as having an association with science.

Yet these spaces have only become associated with scientific activities because of science's influence on spaces and cultures which, White argues, needs to be acknowledged. Science instead is shackled by its historical institutional protocols which limit its perception of cultural value. For White, "[artists] have a feeling about what cultural value is and different kinds of value systems that science does not spend enough time thinking about. And in fact doesn't have time for it; it's not interested in it" (White, 2nd interview, 16/01/2015).

[242] Though, this only came about once his aim of displaying in somewhere 'beyond studio and gallery space' (Hawkins, 2012: 53) had shown the science as unwilling to recognise this understanding of artworks.

For this reason, *The Void* sought to engage the social imaginary of science by bringing publics *to* the site of an experiment, something which would historically be behind closed doors. In this way, he is engaging with the social imaginary of science and using it to posit the new space(s) of experiments. He relates to Rheinberger's (2006) change in perception of experiments, who states

> '…the 'modern' kind of experimentation has been contrasted with 'post-modern' forms of experiment. The former, it is argued, relied on clear-cut separations between laboratory and society, facts and values, nature and culture. In contrast, the latter manifests itself as a "socio-technological [technical] experiment" (Latour) [2001; see 2004] [sic] with no boundaries, 'carried out in real time and in the scale of 1:1', thus retrospectively changing our perspective on the seemingly modern form of experiment' (Rheinberger, 2006: 4).

In drawing on this nuanced understanding of experiments, White seeks to engage the social in experiments, inviting visitors in to see an experiment for themselves and present them with a form of art they can encounter beyond the traditional spaces of art. White is *changing* the spaces of experiments, taking them out of the refined, sealed laboratory and into a new space not historically thought of as hosting scientific experiments.

With *The Void*, however, the OOE did not just change the spaces of experiment to include a cultural space,[243] but if visitors chose to ingest methylene blue, the experiment would also took place inside visitors' bodies. Their bodies became the laboratory, which had two main implications. Firstly, the inner workings of a person's body are unique, changing the conception of a laboratory as exhibiting 'placelessness' (Kohler, 2008) to being context-dependent. Each person's inner workings exist as a culmination of thousands of smaller systems keeping the individual alive, each embroiled in multiple networks both inside and outside the individual's body. And these networks are not just contextual, but social (see Latour, 2005), existing as part of social networks. They are not just expressed socially between people, but contribute to a person's decision-making and understanding.

[243] Such as the Barbican conservatory.

For White, ‘the ‘social’ becomes constituted as a key element of the distributed experiments, as developed in science’ (White, 2013b: 189). Accordingly, using the visitor’s body as the laboratory highlighted how experiments are context-dependent, but are also social and involve people somewhere in the experimental process.

Figure 23 – The Void seemed to pique participants' interest[244]

Secondly, in Rheinbergerian terms, using the visitor’s body as the site of the experiment problematises differentiating the technical objects from the epistemic things. The participant is at once the apparatus – the tools used to perform the experiment – but also the epistemic thing, the ‘thing’ sought to have knowledge about it produced. The body here is a black box, an arena where a multitude of

[244] Source: https://nicolatriscott.org/2012/02/04/lets-experiment-with-ourselves/.

complex processes are happening at any time in a participant-dependent setting too complex to know exactly what is happening. Discerning variables becomes difficult and therefore distinguishing between the technical object and the epistemic thing also becomes difficult. This not only complicates the experimental system and makes deducing meaningful 'results' from it difficult[245] but makes the experiment's outcome dependent on the individual; 50 participants with potentially 50 different interpretations of their experiences (Solhdju, 2006). Fundamentally, this takes the experiment from the quantified and measured (Rheinberger, 1997) to the *un*quantified, introducing too many variables to accurately ascertain which of them contributed to what effect (see Rheinberger, 1993).

The Void had one other unusual caveat in its experimenting which related to temporality and surfaced in the experiment's results. Because the methylene blue did not activate until at least 12 hours after consumption, visitors would have left the Barbican conservatory when it activated. For some, it might be 12 hours, for others 14, and in any case only the individual would be able to see this experiment's physical 'results'.[246] How long did it take to activate? What was the individual's experience of methylene blue? How many days did the effects last for? Only the individual would know.

In this way, *The Void* was a literal form of social practice. The visitor literally embodied the artwork. Without them, the artwork could not exist. This expands to more than just the pill's consumption, however. Though participants were invited to consume the pill, it was their choice to do so or not. Their consumption of it was not a pre-requisite for the artwork, but still constituted it; a decision not to take the pill was one expression of what the project meant to *them*. And White is just as interested in the reasoning behind why someone might *not* take the pill as someone who might.

The Void, then, was an OOE project which highlighted how using site can experiment with the social imaginary of science. In *The Void*, the social imaginary of

[245] Another dimension to this – time – makes ascertaining results difficult, something I move on to discuss shortly.

[246] I draw attention to physical results here because other results might include social results, which I come on to discuss shortly.

science was embedded in current ethical protocol as part of what is permissible in a scientific space. For those on the ethics committee which rejected White's proposal, *The Void* signified an experiment they couldn't condone in a scientific space, representing a line in their imaginary of science which was informed by their understandings of the laboratory space. For visitors, however, it represented an opportunity to reconsider the social imaginary of science, questioning *why* particular spaces were associated with particular disciplines or institutions. By ingesting the blue pill, visitors were reconceiving their imaginary, indicating willingness to conduct experiments in traditionally non-scientific spaces and to do so inside their own body, out of the confines of a sealed, sterilised laboratory environment. The OOE had brought visitors to witness and participate in an experiment, something traditionally reserved exclusively for scientists and not publicly visible.

5.4. Visiting

I scamper under the partially-lifted garage shutter and back into the courtyard. Emerging from under the shutter, I veer right to the front entrance to Objectif, where the large window met the adjacent wall. The door shrieks as I press down the handle, my hand feeling a change in pressure as the mechanism pulls the bolt back inside the door to open.

Figure 24 – Objectif's main entrance[247]

I step up the small carpeted step onto the flat, clean, hard plastic-textured floor. I am greeted by white walls and high ceilings as I make my way in. There sits a small, A5-sized white picture frame sticking out from the wall at a 90° angle, standing at eye-height. Glass on either side, it is transparent. In the middle of it, sandwiched between the glass panes either side, sits a small sheet of paper with two distinct spray-like marks amongst other smatterings. Signed by John Latham, he presented it to Neal as a token for their joint understanding of the one-second event, a tribute to the temporal event-structures characterising their philosophies.

[247] Source: author's photograph.

Figure 25 – A one-second image by Latham given to White in 2005[248]

Moving past this, the space opens out considerably. What presents itself before me is a large, open space on the right, punctuated by a white floor-to-ceiling pillar in the middle of this vast expanse.

On the wall to the left in the near-distance is a wall painting of the Diavik diamond mine in Canada. Above this, I notice the fluorescent illuminated lighting tubes hanging off the ceiling providing the rooms light. Not all are lit, seemingly arbitrarily. I get another flashback, this one being the hour-or-so debating, scrutinising and trial-

[248] Source: author's photograph.

and-error deciding the painting's and space's lighting levels. They were an inspired choice, the painting standing out perfectly effusing a confident aura. In transpires the painting is also proportional, each mine shelf is scaled relative to the next. Black colours in the painting are a blend of black diamond and paint, embodying the undercurrent of diamonds in this exhibition. The painting has been carefully painted at an angle. But why? Then I look to my right and have my answer. In the floor-to-ceiling window, the reflection harks back a three-dimensional Diavik mine, as it would look to sail above. Extraordinary.

Figure 26 – White's Diavik painting[249]

Sitting alongside this window, sits a simple grey table with a black, 1980s computer monitor on it. To the right of the JVC monitor sits a small rock with a pair of glasses perched delicately atop. Upon closer inspection, the glasses are fastened to the rock using fishing line to prevent them falling off during the show. These glasses were formerly John Latham's. They are perched on a rock taken from Rozel Point, the site of Robert Smithson's Spiral Jetty. This simple gesture reveals two of White's main influences, Latham and Smithson, combined through a rock from the site arguably Smithson's most famous work.

[249] Source: author's photograph.

I lift my head up. In front of me, diagonally obscuring the back corner is a pull-down screen playing a projector's recording. The films are mashed together on a loop and taken from Rozel Point. Some were of the site and landscapes, collected and filmed by Smithson before his death. Others were filmed by White and the OOE, some of which show the OOE cipher, Randy, on a bike marking out a Spiral Jetty replica in the sand.

Figure 27 – Pull-down screen with video playing[250]

[250] Source: author's photograph.

Upon finishing the video, I stand and pause. Is this the exhibition's 'end'? I can't see anywhere else for it to continue. Where does it end? Looking around, I notice how small I am in this large open area, somewhere to stand and ponder. It transpires this will be the gathering point of the exhibition during its opening, the main space where conversation is expected to happen. And they will have much to talk about if they have found it even half as interesting as I have.

This expansive gallery space is inviting, and provides an opportunity for conversation. On the opening night of *Sites of Excavation and Construction*, visitors gathered in this space, wine glasses and nibbles in hand, to chat to one another. To build such a space into an exhibition's design is characteristic of White, conversation frequently being an integral part of his projects. At the OOE, White commonly uses social practice to construct artworks where visitors and their conversations *were* the artwork.

One such project was the OOE's *Secrecy and Technology* bus tour. This bus tour was one of 12 outputs from the OOE's *Overt Research Project* (ORP) during the late-2000s, which was set up to map 'the UK's mythology of secrecy [by] exploring the spaces in which experiments, knowledge and intelligence are critical, but which are concealed, secret or inaccessible to the public' (OOE, in Griggs, 2010: n.p.). This bus tour took a collection of practitioners, such as artists, academics, and others, around so-termed 'dark places' in Southern England on a coach for a day and invited them to explore these secretive organisations as experimenters. The aim was to provide 'a fascinating bus tour of advanced technological development…sites that emerged during the tensions and paranoias of the Cold War' (OOE, in Griggs, 2010: n.p.). Once on the bus, the project commenced with White announcing '[w]elcome to the Dark Places bus tour. Today we want you to be part of this; we want you to be the experimentalists' (OOE, in Griggs, 2010: n.p.).

Participants visited the Chilbolton Observatory,[251] the Chemical and Biological Defence Establishment at Porton Down,[252] Royal Air Force Boscombe Down,[253] the International School for Security and Explosives Education (ISSEE)[254] at former Royal Air Force Chilmark, and the Land Systems Reference Centre at Blandford Camp.[255] On the bus, participants watched videos of media stories and interviews (Davies, 2010) about these and other sites to capture participants' imaginations and critically engage with sources of information in between experiencing each site. These sites looked mundane, uninspiring, or sometimes impossible to get close to,

[251] The Chilbolton Observatory is not a military classified site, but nonetheless only allows public visits every 18 months. The media reported it being the site of 'some elaborate crop circles in 2001' (Griggs, 2010: n.p.), though this was revealed to be the work of artists (Griggs, 2010). Its website describes as it being 'home to a wide range of science facilities covering research in atmospheric science, radiocommunications, astronomy, space science and technology' (STFC, 2017: n.p.).

[252] Porton Down is arguably the most famous of England's 'dark places'. It is a Defence Science and Technology Laboratory (DSTL) situated near Salisbury, Wiltshire. Porton Down reportedly is involved in military defence research (Mosley, 2016), alongside researching particularly deadly diseases such as Ebola (BBC, 2014; DSTL, 2016) and an array of other projects for their 3000 scientists and £500m budget (Mosley, 2016).

Porton Down was also the subject of the OOE project the *Mike Kenner Archive* (MKA), a part of their *Autonomous Researcher Collection*. The *MKA* showcased the personal collection of documents, images and other materials acquired over 30 years' worth of research by activist Mike Kenner relating to scientific experiments conducted at, or by scientists at, Porton Down (OOE, 2016a; Kenner, 2006). Obtaining these materials through legal loopholes and transparency legislation such as the Freedom of Information Act (2000), Kenner confirmed his suspicions over biological tests carried out in and around Weymouth, his hometown. He discovered tests carried out unwittingly on local populations during the later 20th Century. Primarily, tests used live pathogens, biological, and chemical agents – the most controversial of which was the toxic zinc cadmium sulphide (ZnCdS) – which were dispersed through the air from aeroplanes and spraying vehicles without populations' consent.

[253] RAF Boscombe Down is a highly secretive place and active research hub owned and operated by the private defence and security company, Qinetiq. The RAF's website describes Boscombe Down as the 'tri-service home of military aircraft Test & Evaluation and the Boscombe Down RAF Support Unit which provides administrative support to the military lodger units' (RAF, 2017: n.p.).

[254] ISSEE is the former site of munitions storage and priceless artworks from the British Museum during World War II, and a current emergency explosive scenario planning facility. ISSEE describes itself as 'first choice for counter-terrorism, explosives & security consultancy and advisory services to national and international Defence, Police and Commercial organisations' (ISSEE, 2016: n.p.).

[255] In its own words, the LSRC is 'the MOD's [Ministry of Defence] vital test and reference facility providing a Centre of Excellence that assures end to end systems engineering, ensures reliability, confirms interoperability and evaluates performance of Land Environment (LE) Communications and Information Systems (CIS)' (LSRC, 2016: n.p.).

attempting to use their innocuous exterior and concealment as camouflage to hide in plain sight.[256]

Figure 28 – Departing the coach during the Secrecy and Technology bus tour[257]

In the *Secrecy and Technology* bus tour, White uses a different conception of site to experiment with the social imaginary of science. Here, he is *expanding* the sites of experimentation to include sites of different purposes and of different kinds of experiences. Many of these sites seek concealment, reveal little information to the public, and may be conducting experiments but not necessarily ones the general public know about. The *Secrecy and Technology* bus tour, then, like *Truth Serum*, questions the roles of sites in experimentation. The tour questions the belief of experiments being restricted to laboratories in an expert-led environment with a

[256] This particular style of camouflage, White states is a UK-specific method. He contrasts this with CLUI's approach to secretive sites, stating: "[America] has everything they need. […] They have […] a kind of spatial sense of scale, which they can exploit a lot. I mean […] there's a lot of land use happening. […] You come back to the UK, you realise what a tiny dot that it is that we live on, and there is no space. […] By comparison there's […] few remote places. […] We have to find other ways of concealing things and hiding things, and that's where the hiding in plain sight comes from" (White, 2nd interview, 16/01/2015).

[257] Source: http://www.nealwhite.org/.

narrow distribution of expertise by exposing these otherwise little-known or concealed expert-led sites.[258]

Using such secretive sites to expand the sites of experimentation also expands the ways there are perceived of in the social imaginary. Visiting them gives participants an opportunity to *experience* sites they've likely only previously read or heard about. Meanwhile these sites which seek concealment are temporarily turned into tourist sites, having a coach-load of eagle-eyed and interested individuals turn up at their gates to think and engage critically with their activities. Turning up, asking questions, making notes, and observing gives the participants new opportunities to use their experience to inform their own imaginaries of these sites. For Davies (2010), who participated on the tour, the bus tour is an experiment, and

> '…one of placing ourselves in relation to these sites. This event is about locating these facilities within the landscape, tracing their patterns of visibility and invisibility. But it is also, critically, about exploring the embodied practices of what it means to try to encounter these experimental sites. Placing sites opens up alternative means of narrating them, unfastening them from their singular association with the abstract spatialities of military science and technology' (Davies, 2010: 668).

The active role of the participants Davies alludes to touches on two key aspects. The first is social practice. Participants on the coach were the focus of this project, and as White announced at the day's beginning, they were the experimentalists. White was interested to explore the 'the public's imagination of these places, contrasting the official information with the myths, conspiracies and stories that surround these spaces' (White, 2011: n.p.). The OOE, then, sought to experiment with how participants experience and make sense of these secretive sites amidst new information and experience:

> 'Specifically we were interested in those sites that were not normally accessible to the public, either in terms of knowledge of their existence as

[258] I argue these secretive sites are 'expert-led sites' because little information about them reaches the public realm, therefore keeping their inner operations in the hands of the comparative few, many of whom work there.

> specialist spaces or in terms of general access. We wanted to know […] what was being done, not in isolated one-off artist projects embedded within the institution itself as had previously been the case, but across the whole spectrum, and autonomously, through independent eyes, set in a landscape we suspected we did not know as well as we should' (White, 2011: n.p.)

Accordingly, the participants determine what these sites mean, how they feel about them, and how they experienced them. Here, social practice is crucial in implicating the social imaginary. White gives the example of science, stating "I think this is something that science is yet to get grips with; that science is possibly also what people perceive of it as well as what it is" (White, interview in JHG, 2012). In this way, the OOE use site to experiment with the social imaginary of science through visiting these sites. Given many of these sites are former Cold War sites, they embody legacies of the Cold War and remind participants of science's historical problematic alliances with other sectors and industries (e.g. MacLeod, 2001), as highlighted in *Truth Serum*. These sites therefore represent powerful opportunities to reflect on imaginaries of science through sites grounded in the (pre-)Cold War but still used for contemporary science and technology.

The second key aspect returns me to the tension between the informational and experiential in much of White's work. While on the coach travelling to each site, White explains how the OOE showed media on television screens, tapping into imagination and perception, and questioning "the ways in which knowledge is represented, and those instruments by which it's represented, i.e. those institutions or sites" (White, interview in JHG, 2012). He states:

> "On the bus tours that we've done, we've shown some conspiracy films. It's stuff that looks almost exactly like a documentary or an information film that you would see from an organisation. In fact, we usually play them back to back with something similar that we can find, so that the two things look so similar that people are kind of looking at one thing and they're laughing. And then [they're] looking at the next thing, which is the real thing and going "that's also funny…"", (White, 2nd interview, 16/01/2015).

Most of these visited sites disclose limited publicly accessible information, meaning many ideas about them come from media outlets, websites, or written sources. In this absence of information, this void instead becomes filled by journalists, authors, film editors, or other non-organisational sources, which sometimes include imagination. These sites cast "a shadow, […] the darkness casts a shadow which is what you don't know, and that's the space in which the imagination becomes very fertile" (White, interview in JHG, 2012). However, given these sites are so secretive, information given out by their organisations is not guaranteed to be accurate. Rowell[259] agrees, stating "[l]ooking back through time at any institution or scientific development there always seem to be a lot of dark stories, it's just a matter of finding them. There's lots of disinformation out there" (Rowell, interview in Griggs, 2010: n.p.). And this is the point of clashing the different videos on the journey, to encourage a critical reflection around which information sources and claims of knowledge participants trust.

In this way, the participants become their own experts by physically visiting these sites. They can explore the sites for themselves, ask questions, and make observations, potentially having a better idea of what goes on at sites many of which might be innocuously passed by every day. That said, the assumption of experience being more 'valid' than information is a tension White is highlighting. Just like information on websites can be inaccurate, so too can face-to-face answers to questions, or not being shown particular parts of facilities. But either way, both the information and the visit affect the participant's perception of these sites, affecting how they exist in the social imaginary and therefore affecting these sites' existence.

In the *Secrecy and Technology* bus tour, the OOE use these secretive sites to expand the sites of experiments, both conceptually by exploring several sites in the same project, but also physically by taking participants to sites where active experiments have been or continue to be (unknowingly) conducted. Experiments, then, are being brought out from the shadows into the public light. Using these sites in this way allows the OOE to raise key questions around the social imaginary of these sites and their secretive uses. Yet using information to inform participants'

[259] Artist Steve Rowell is the OOE's Independent Research Director (International) and assisted in this project.

experiences of these sites also affects how these sites are perceived by the participants. The bus tour, then, returns to key ideas surrounding experiments under scientific protocol in laboratory spaces, but in hidden or secretive spaces which do not look scientific or suspicious from afar.

5.5. Conclusion

In this chapter, I have used *Sites of Excavation and Construction*, a recent Neal White exhibition, to link together key themes in his work relating to site and the social imaginary in relation to science. I did this by using a first-person account from my field notebook to describe my experiential encounter with his work which I then linked to four key OOE projects: *Dark Places*, *Truth Serum*, *The Void*, and the *Secrecy and Technology* bus tour. All four of these projects pre-dated my Ph.D.'s commencement meaning I was unable to experience them. Consequently, I had to rely on what I *read* and have been *told* about them, i.e. the informational. So by weaving first-hand accounts with my research of these four projects, I sought to mirror the OOE by linking the informational and experiential.

In each of the projects, White uses a different relationship to site to experiment with the social imaginary of science. This represented one relationship with one factor (i.e. site) as part of one facet of science (its social imaginary). His work therefore revolved around an engagement with institutions; he uses his parallel *institution*, the OOE, to experiment with sites of *institutions*, drawing on the the fourth wave of *institutional* critique, and does so to explore a facet of science which oversees a plethora of institutions across different scales. The significance of this relates to how he uses sites, and *which* sites he uses. Drawing on the fourth wave, White speaks to Krauss's (1979) identification of art expanding beyond its conventional artistic spaces. He uses non-conventional art spaces in four of the five projects I explore in this chapter. In *Sites of Excavation and Construction*, however, he returns to the conventional artistic space of the gallery but does so with nuances. White uses the basement to show how these artistic spaces can be engaged with in different ways. Now artists are operating in the expanded field, they are no longer confined to use even artistic spaces in set ways. Four successive waves of institutional critique have

given them more licence to use institutions as necessary rather than being shackled by them.[260]

But White also draws on experiments. His affinity for experiments relate to the move towards artistic practice as research, and of seeing value in artworks as works of knowledge. He uses the term 'experiment', a term which both scientists and artists use,[261] to collapse the experiment's scientific rooting, folding it into artistic experiments to produce artworks exhibiting new forms of knowledge. These make salient contributions to contemporary understandings of experiments, which White highlights the nuances of:

> '…we can understand that neither the 'experimental subject' nor the process of 'experimentation' as an approach has necessarily changed, the networked and social context of that experiment and that experimental subject as a figure in the research process has altered. In this respect, the critical reflections on this research mirror the 'troubled genealogy' description as the published research challenges not only the disciplinary development of knowledge, but describes the development of a new critical form of knowledge production' (White, 2014: 44).

For White, a key way of engaging with a nuanced experiment was to involve the social context of experiments, which he chose to mobilise through using social practice in different ways and forms in each mentioned OOE project. White sought to highlight how institutions are socially constructed by experimenting with the social imaginary, in particular, of science. This, he hoped, would prompt conversation and critical *reflection* of science and what people *perceive* of as science. His different engagements with site in different projects acted to provoke conversation in a

[260] White discusses how he sees his OOE's relationship with other institutions. He states: "so in a way, it borrows from that Critical Art Ensemble approach, which is that turn […], using the 'research turn' I suppose in order to go "yeah let's look at all your stuff to look at *you* [the institution]! […] So let's have a look at how *you* look at others!" and then look at you in the same way" (White, 1st interview, 19/12/2014).

[261] White explains, stating: "Experiments in art [and] experiments in science have been around for a long time. They mean very different things, but the fact that they both call them the same thing is useful" (White, 2nd interview, 16/01/2015).

contrasting way to the CPNH museum, which exists on-site in Pittsburgh, and which I now come on to discuss in the next chapter.

6.0. An Enchanting Sensibility: Experimenting at the Center for PostNatural History

This chapter represents the third of three empirical chapters, and explores closely the work of Richard Pell at his Center for PostNatural History (CPNH).[262] Like the OOE mentioned in Chapter Five, the CPNH stems, in part, from relationships and expertise derived from the groups discussed in Chapter Four. Following these influences, this chapter is the second of two which focus on a key practitioner of the network mapped in Chapter Four – in this case, Richard Pell – to ground Pell among his work and practice in relation to audiences.

In this chapter, I examine how Pell uses the CPNH to experiment with prompting public discussion around contemporary science and technology. The CPNH is an artist-led 'parallel' institution based in Pittsburgh, a well-educated[263] city with significant higher education and pharmaceutical industries[264] which help spawn interest in a museum like the CPNH through high numbers of college graduates interested in learning as well as in science and technology.

There are aesthetic considerations which come to light when discussing a physical museum like the CPNH. It is a physical space to be encountered and therefore has been crafted and curated to evoke a particular form of aesthetics. Accordingly, I frame this chapter around aesthetics. The CPNH is produced by a particular aesthetic sensibility Pell creates. Given the CPNH is the only institution in the world which explicitly and exclusively documents postnatural organisms in the world (Pell, 2015a), this sensibility also frames understandings of the postnatural. I show this aesthetic sensibility through five facets of the CPNH which demonstrate how it experiments with public discussion of contemporary science and technology. These five facets are 1) 'framing', relating to how the CPNH is conceptually framed; 2) 'designing', relating to the CPNH's physical and conceptual design; 3) 'relating',

[262] As Pell is quick to point out, the CPNH is not a solo venture. That said, he performs a greater portion of research, display, and general maintenance tasks, as well as being more instrumental in collecting the specimens and designing the space, than anyone else. So while there are others involved in it, their contribution is dwarfed by Pell's.

[263] Pittsburgh has 30 higher education institutions within a 50 mile radius of the city (PP, 2015).

[264] A significant employer in the city is the University of Pittsburgh Medical Center.

which corresponds to how the CPNH relates to similar existing institutions such as natural history museums; 4) 'curating', relating to how displays and specimens are curated; and 5) 'enchanting', relating to how the CPNH uses objects, in addition to these other four facets, to produce an enchanting encounter for visitors.[265] For Pell, these five facets predominantly relate to showing the *ramifications* of science and technology, one aspect of science and technology the CPNH is especially interested in provoking discussion around.

To show my reactions to the aesthetic framings Pell employs, I explore these facets by using fragments from my field notebook to describe and outline them. In this instance, my field diary was crucial in documenting my initial thoughts and feelings when encountering the space, which is a key component of what Pell believes encourages conversation in social practice. Encountering the space on one's own terms is crucial, as this chapter highlights, and prompts the visitor to ask and confront questions. I explain how these diary fragments relate to the chapter's key themes around artistic practice as research, and social practice, both of which the Center draws on extensively. The CPNH uses its research on the postnatural to engage and educate visitors about the ramifications of science and technology which is one key way they stimulate public discussion around contemporary science and technology. However it also seeks to inspire participants to recognise their role as participants in shaping these organisms' genetic evolutionary trajectory, and inspire them to conduct their own research and make personal decisions based on their interpretation and research. In these ways, the Center serves two functions, firstly to show what science and technology can achieve, and secondly to prompt personal reflections on whether such advances should necessarily be enacted, and if so how, and by whom.

[265] Throughout this chapter, I alternate between terms used to describe people who visit the CPNH. I generally use the term 'visitor' when making a point about something besides the person's agentic capacity to influence their perception of something. I also use 'participant', using this when I want to infer people's agency and their capacity for influencing their perception.

Figure 29 – An open Center for PostNatural History[266]

‘Postnatural history is a vast realm intertwined with every human story of survival, catastrophe, seduction, and purging. Our main goal is to raise curiosity and awareness concerning our relationships with other forms of life on our planet – the kind of awareness that is often missing from the conventional museums of the living world’ (Pell and Allen, 2015: 224).

6.1. Opening

Opening the door of the Center for PostNatural History in Pittsburgh, Pennsylvania I was overcome with a flurry of emotions. After 15 months planning, I was finally here, and this was undoubtedly exciting. But beneath this bubbling anticipation was also a simmering apprehension. What would it be like? Might I even be disappointed once its potential is stripped away and replaced with a reality? This is it. A tranquil, almost serene atmosphere drifts out the entrance, luring me in. Stepping up the concrete step, the door clicks shut behind me. I am now in the world of the postnatural. What is this mysterious world?

[266] Source: author’s photograph.

> "If we think about Darwinian evolution, if we were to grab any two living things in the world and we were to compare their family trees way back […] there's a common ancestry. The tree eventually converges. What's interesting about postnatural organisms is that that convergence always […] converges in a place where there's people [sic], a cultural place. Somewhere, somebody was breeding this organism that later on had all this diversity […]. But the common ancestry brings us back to a *particular* place, not an abstract one" (Pell, interview in Makers of the Waag Society, 2012).

Upon entering, I am bamboozled. What is all this? What is this wall paraphernalia? Seemingly eclectic images are mounted in frames on the wall behind the front desk with no identifiers. One sits there of a cockerel with an unusual spur on its head, resembling an odd hairstyle. This reminds me of Pell's description of the postnatural, stating it is:

> "…not just giving a dog a weird haircut; it's breeding a dog that has weird hair. And its offspring will have weird hair forever" (Pell, interview in The Influencers, 2014).

Another image is of an African American woman I identify as Henrietta Lacks,[267] *and another of what appears to be a magazine clipping about Sea Monkeys™*.[268]

[267] Henrietta Lacks was an underprivileged, black tobacco farmer, who died of cervical cancer aged 31. Her tumour was biopsied without her knowledge and used to grow cells in a laboratory to better understand cancer. Her cells began the HeLa line of cancer cells, which have been culturally grown and had vaccines, like the polio vaccine, developed from studying them. Further information available here: http://www.smithsonianmag.com/science-nature/henrietta-lacks-immortal-cells-6421299/.

[268] Sea Monkeys™ are artificially-bred forms of the crustacean, brine shrimp, whose eggs hatch once water is added. Pell describes them as being 'selectively bred in the early '70s so that they would have this extra long dormant cycle in their egg state and they were able to increase that yield so that you get that satisfying swarm' (Pell, in Hitt, 2016: n.p.).

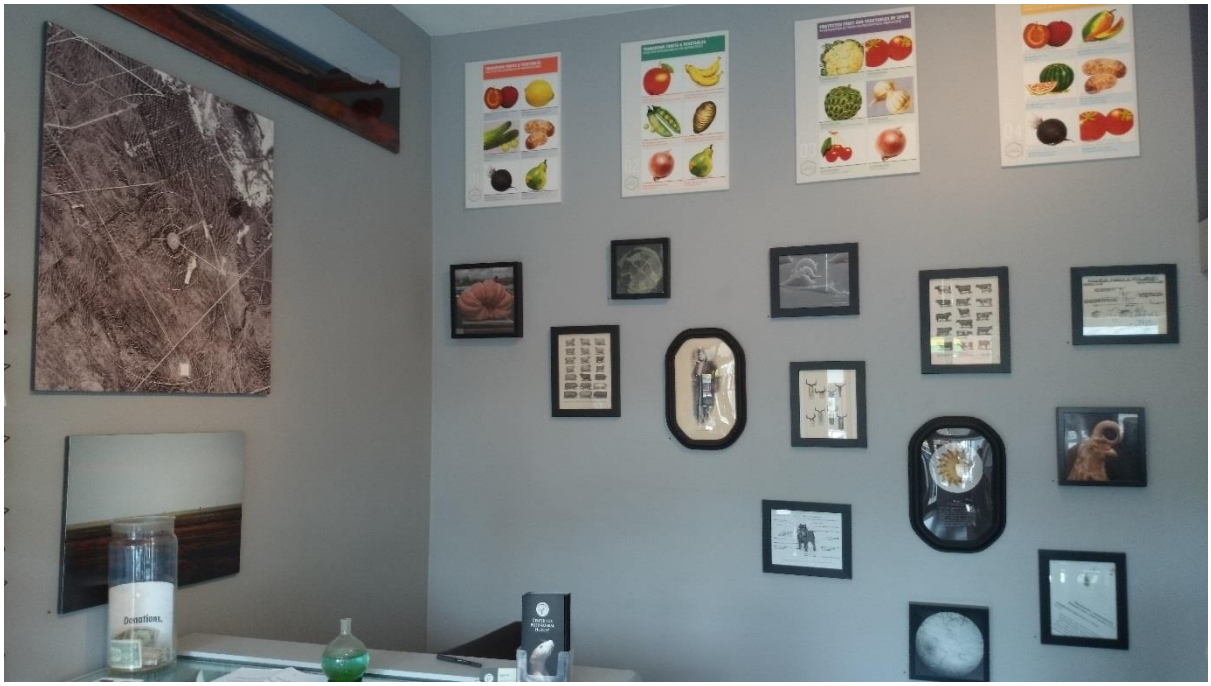

Figure 30 – Back wall paraphernalia, with landscape images adjacent[269]

To my right, I look past an imposing dark part-circular curtain to find a considerable metal converted bookcase with a viewing window. It has a range of further unusual-looking specimens gathered together. None of them have identifiers. They range from dog skulls to stuffed pigeons, to books about mice, dog breeding and breeders, as well as breeder magazines, and animal cards which used to be included with packets of cigarettes in the early 20th Century:

[269] Source: author's photograph.

Figure 31 – Display cabinet in the foyer[270]

[270] Source: author's photograph.

To the right of this bookcase sit enlarged 3D prints of a British Bulldog skull and a Great Dane skull. Above this is a striking, highly-zoomed 3D print of an impaled mosquito.

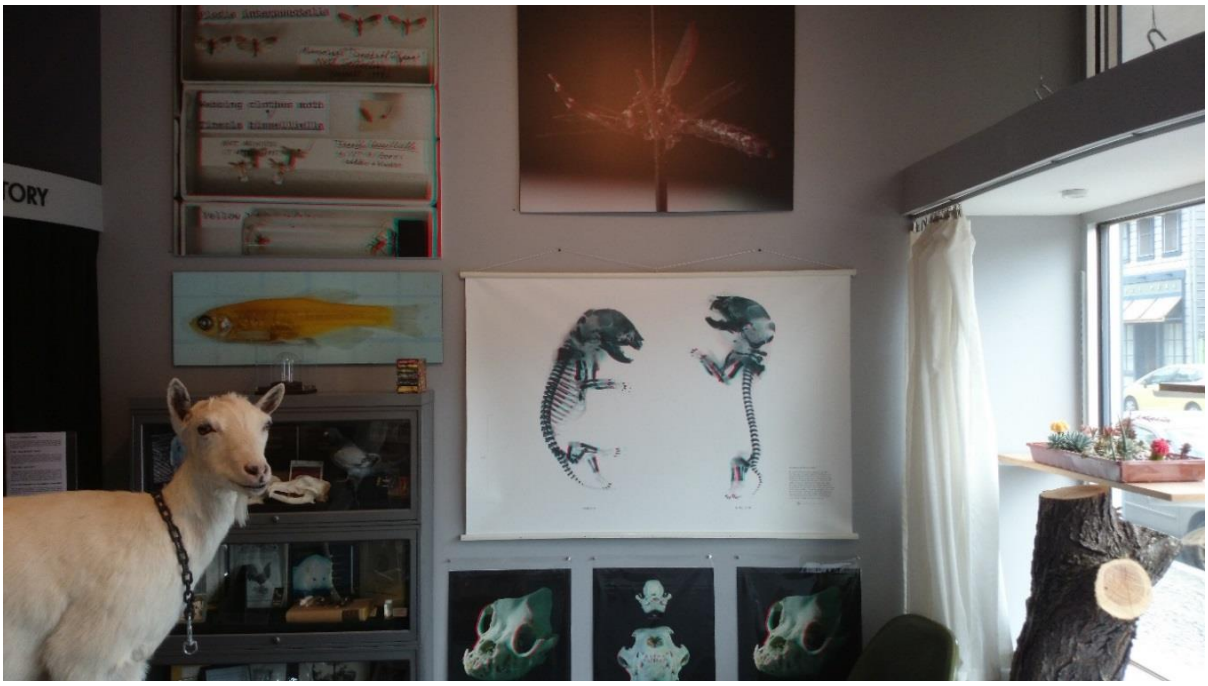

Figure 32 – An impaled mosquito in 3D sits at the top of the photo[271]

But a large multi-coloured print takes pride of place. The print is of two organisms resembling something from another world at first glance; almost monster-like, on their sides and slightly curled. On closer inspection, they are mice embryos, but with one significant difference between them. One has no ribs. The other has ribs stretching from its head down its spine and stopping just before its hind legs.

[271] Source: author's photograph.

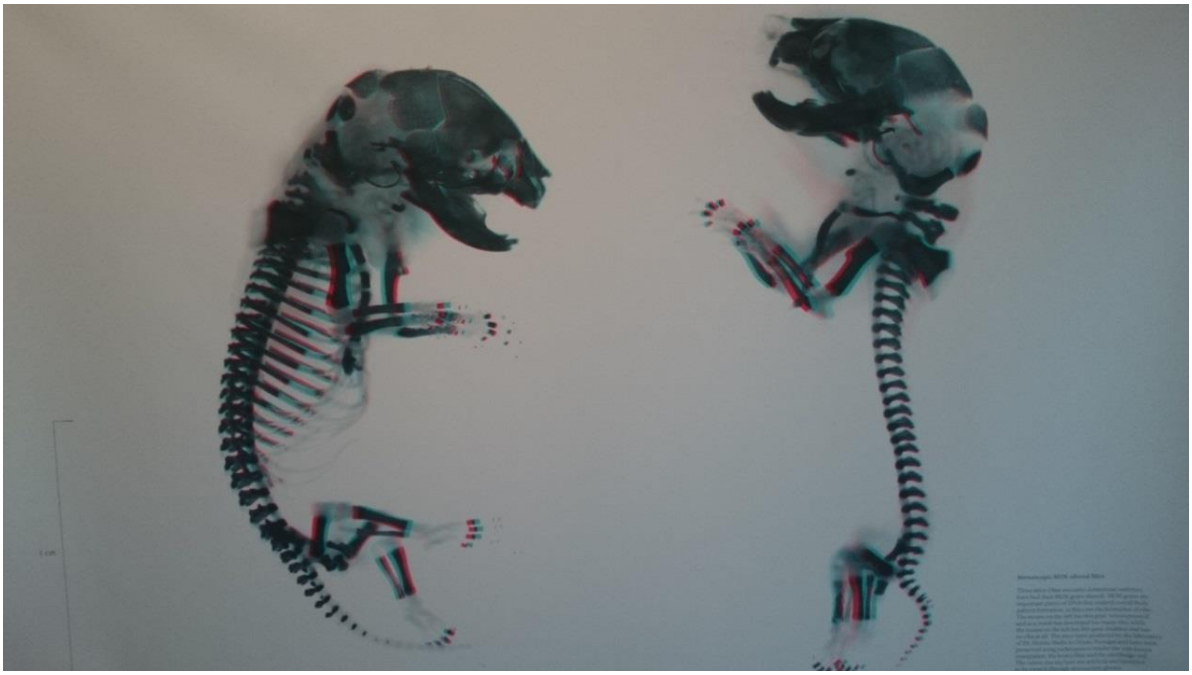

Figure 33 – Mice embryos[272]

It transpires these mice embryos were the subjects of an experimental trial by Dr. Moises Mallo's research team in Oeiras, Portugal who were experimenting with Hox genes.[273] *One embryo has the gene 'knocked out'*[274] *and has no ribs; the other has the gene over-expressed and has too many ribs. Whilst this is unusual to have such an image prominently displayed in the foyer, my pre-trip research on this place has prepared me for such surprises. Seeking to capture visitors' imaginations rather than intimidate or obfuscate, the Center gently displays culturally-altered organisms designed to pique the visitor's curiosity.*

I turn back on myself to witness the left-hand wall. It seems just as eclectic. Newspaper clippings of articles relating to the Center appear on a noticeboard-styled painted wall segment. Sparser than the other walls, an image of the Dugway Proving Ground[275] *stretches along the top segment of the wall. I almost look straight past what turns out to be an intimidating floor-to-ceiling list of all of Monsanto's terms and*

[272] Source: author's photograph.

[273] Hox genes are responsible for embryonic development along the head-tail axis.

[274] 'Knocking out' is the colloquial term for limiting the expression of, or removing altogether, a particular gene. Further information available here: http://genetics.thetech.org/original_news/news63.

[275] The Dugway Proving Ground is described by CLUI as '[t]he nation's primary chemical and biological weapons testing and training' (CLUI, 2017b: n.p.). Further information available from CLUI's *LUDB* here: http://www.clui.org/project-site/9100/6612.

conditions. These are what the purchaser unwittingly agrees to by the simple act of opening a bag of Roundup Ready® corn:

Figure 34 – Monsanto's imposing terms and conditions[276]

Turning full circle on myself, I face the Center's door nestled in the right-hand corner of the storefront from the inside. To the door's left, the front window contains copious

[276] Source: author's photograph.

plants alongside a hanging plaque defining and explaining about postnatural history. A visitor guestbook sits beneath the plaque, along with some CPNH books, advertising the Center to passers-by.

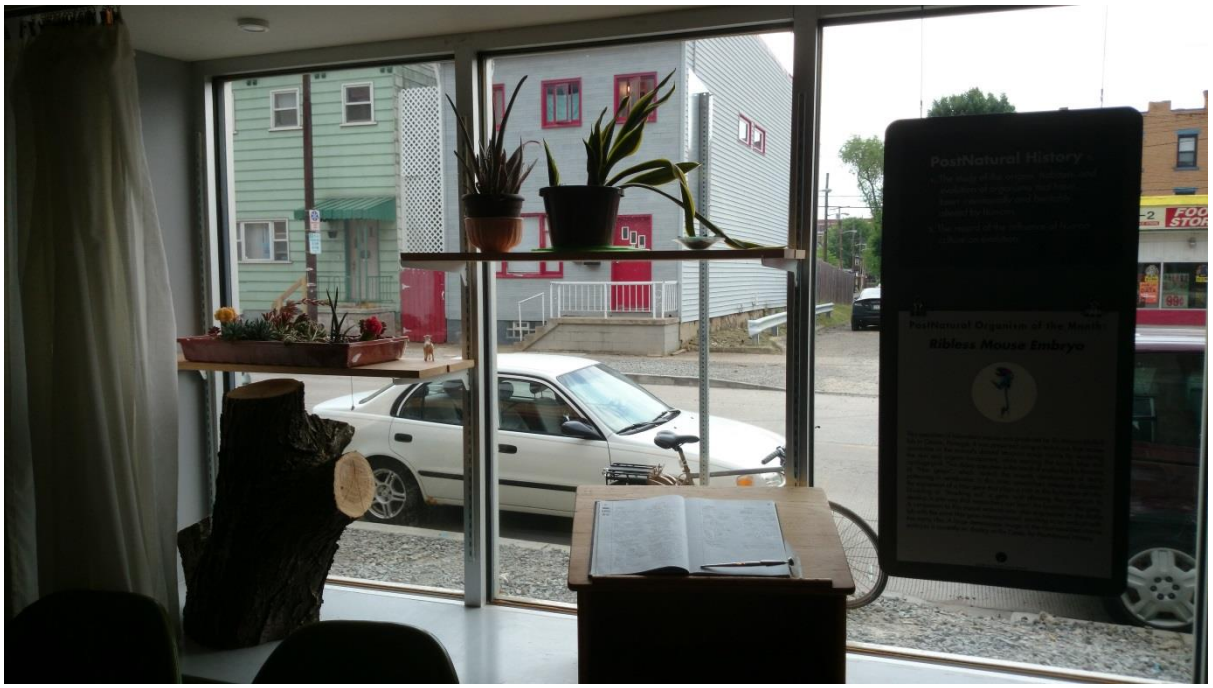

Figure 35 – View from inside the CPNH's introductory window[277]

Having set myself, I move into the museum. A striking presence is Freckles, a considerable taxidermal BioSteel™ goat, genetically modified to produce silk from a golden orb-weaver spider as a naturally-occurring protein in her milk. Freckles was one of a herd of BioSteel™ goats bred on the same Utah research facility aiming to commercialise this light, versatile and durable silk for military purposes. Her milk would be threaded through a hypodermic needle to extract the silk. Her silk was genetically identical to its spider counterpart, with the added bonus that herding goats is much easier than herding cannibalistic golden orb-weaver spiders. Should Freckles have reproduced, her modified genes would have passed the spider silk genetic trait to her offspring. Her genetic make-up was altered intentionally by people to commercialise spider-silk, and would be passed on to her offspring, making it heritable. She is therefore considered postnatural and occupies pride of place in the Center's foyer.

[277] Source: author's photograph.

Figure 36 – Freckles[278]

My eye is inescapably drawn to Freckles' considerable presence – enormous next to any other exhibit. She is the largest specimen in the CPNH, and one that presented logistical difficulties in her acquisition. Unusually,[279] *one of the researchers at the facility in Utah contacted Pell to offer him Freckles. After liaising further, a road trip ensued to Utah to collect Freckles in a car's back seat on a hot day. The journey was long, and after collecting Frekcles, an overnight stop at a motel was required. And Freckles was still on the back seat. Not wanting to risk complications, she came into the motel room too, propped up against the front window; although whether she was already taxidermic at this point, Pell doesn't confirm.*

Above Freckles is the gateway to the Hall of PostNatural History. Guarded by the curtain the Hall exudes an air of mystery allowing me to wonder what it's concealing. I feel entranced, a pleasurable but incommensurable and, to an extent, incomprehensible array of material laid out before me. I am at once overwhelmed and enchanted. How did this spell-binding space come about?

[278] Source: author's photograph.

[279] In interviews, Pell revealed it was far more common for him to have to approach key individuals and institutions for exhibits than for them to approach him. He made clear the extents he had to go to in order to ensure they helped him. Methods include expressing an interest in their work and opening long-term conversations, often by reading their latest works and offering to preserve a piece of their research in his museum. It is a very delicate process, and one Pell takes extraordinary care in doing.

> "There was this stuff [natural history museums] were leaving out, and it tended to be things that had a cultural imprint on them; things that had been intentionally shaped by people. […] It seemed the more these things had been changed by people the less likely they were to be represented in a natural history collection; that this wasn't just an oversight, this was an intentional omission. And that essentially is where the idea for [the CPNH] comes from. The basic concept behind it is that these are living things that have been intentionally shaped by people and that it's heritable, that it affects the offspring. So it has evolutionary consequence" (Pell, interview in Makers of the Waag Society, 2012).

*So everything – **everything** – I am witnessing is postnatural. Dogs, salmon, Freckles, the chicken with a spur on its head, Sea Monkeys™, everything.*

At its core, the postnatural is a cultural phenomenon. It shows humankind's impact on the living world according to our cultural desires, altering organisms to reflect our cultural wishes. Pell states "ultimately we are essentially a cultural museum. We are amassing these cultural artefacts; they happen to be living things, but we are looking at them as cultural works" (Pell, 3rd interview, 19/05/2015). In a similar way to how CLUI read the landscape 'anthropogeomorphologically', the CPNH argues the living world can also be read to understand the cultures that produced them.

The Center is intentionally positioned to encourage critical reflection on the species displayed before them, and the role of science and technology in producing them. Genetic modification, selective breeding and domestication are not just terms, but showcase humankind's interference in producing these species. They have direct and far-reaching ramifications on global ecological systems, networks and the planet's holistic environment. Here, these consequences are plain to see. The postnatural is everywhere. And it has been going on since the dawn of human civilisation.

Rich and I sit down at his kitchen table. "Well, you made it!" he says welcomingly, through a grin: "welcome to Pittsburgh!" We are in his home, in close proximity to the Center's quiet neighbourhood situated on Penn Avenue, a long, substantial road in Pittsburgh's Garfield neighbourhood. Undergoing redevelopment, it looks messy and

half-baked at the moment, though locals seem undeterred. Outside the sun is bright and glorious, spearing through the large and inviting windows which offer a nice view on a summer's day.

We chit-chat for a bit, catching up before talking work. 'So' Rich starts, 'are you here studying the postnatural or are you studying us studying the postnatural?' A simple question in many ways but it questioned the CPNH's purpose. Was it to present the postnatural, or to frame it on their terms?

> "The original vision of the museum was a place in which people that had wildly different backgrounds, wildly different opinions and experiences could both feel welcome […] and run into each other, and have a conversation that they might not have otherwise. […] In the beginning I was specifically imagining biological scientists and anti-GMO activists who were opposed to transgenics or people who create transgenic life as a matter of course or career. I wanted to make a place where both of those groups would wander into with interest, and could enter a conversation that otherwise is very, very difficult" (Pell, 1st interview, 28/04/2015).

From this quote, Pell clearly draws on social practice in an effort to bring together different practitioners, such as activists and academics.[280] The CPNH is the medium to start conversations about a potentially politically charged theme involving sensitive topics such as genetic modification. From these conversations, the CPNH hopes to produce actions. To allow thoughtful and insightful discussion rather than provoke an onslaught of automatic ham-fisted opinions between people, the CPNH had to be pitched carefully. This speaks to two key considerations. The first is around framing, the second around display. I now turn to each in turn.

6.2. Framing

[280] Angela Last (2015) also discusses using art as a way to encourage activists and academics to talk to each other.

Rich is ready for the get-go. After talking me through what to do when working at the CPNH, a visitor enters. An auburn-haired woman seemingly in her mid-late 30s, she's wearing a rucksack over one shoulder of her vest top and an ankle-length floral skirt. The pattern of the brightly-lit skirt seems more suited to the vibrant sunshine outside than to the darker, more mysterious CPNH colours. Rich reads her body language of bewilderment. Just when she starts tripping over questions marks, he chirps up "Hi there! Welcome to the Center for PostNatural History", smiling openly. "Have you been here before?" It transpires she has walked past several times but never been in, to which Rich replies "we get that a lot! I'm glad you made it in today." The exchange continues and Rich is careful to wrap it up in well under a minute.

The Center is free and is self-guided, and the main exhibits are behind the curtain in the Hall of PostNatural History. Once there, visitors can press a green button to start an introductory video. "Oh, I didn't realise there was another room behind there!" the woman chuckles, tottering off behind the curtain for a better look. She – like me – didn't see the curtain the first time; the colours blend so well it almost hides in a delicate blend of subtlety and canny craft. Being self-guided she can spend as much or as little time as she likes there. Any questions she has Rich will happily chat about after, in the foyer. After such a brief introduction, Pell seeks questions. Instead of being given a frame to experience the space through, Pell's introduction is brief and therefore leaves much unanswered. Visitors can make their own mind up about their experiences. These questions are just as fundamental to the visitor's experience of the Center as the displays are. "The project is most successful when it is inherently social and it's not just a person reading […] that there is some conversation happening. That's really important to the whole thing" (Pell, 1st interview, 28/04/2015).

A short while later, a more confident, refreshed, and invigorated woman emerges from behind the curtain, scarcely the same person who stumbled in minutes ago. By now, Rich has had to uncharacteristically dash off, and I'm instead joined by the Center's Research Fellow, Derek Griesbach. He asks what she thinks. "It's really cool" she replies, "like, really cool. I've never seen anything like this before. Where did you get all of this stuff from?" Derek holds fire on answering her question, instead introducing me and explaining my research. I describe the painstaking lengths Pell

has gone to in acquiring exhibits. She's particularly interested in the Silkie chicken, drawn to its elegant, fluffy appearance which vividly contrasts the commercialised battery chicken she's accustomed to.

Figure 37 – Silkie Chicken[281]

[281] Source: author's photograph.

It transpires she's a research technician at one of Pittsburgh's numerous universities but maintains a personal interest in art. She then remarks the Center's design has some hallmarks of an artwork, at which point I confirm "it's interesting you say that because the Center's Director, Richard Pell, is an artist himself". "Ah, I see" she says. "Is this a specific project of his?" "Well", I reply, "it's not really a project per-sé, but he has had it in residence at the STUDIO for Creative Inquiry at Carnegie Mellon University. He's an Art Professor there". Conversation continues discussing backstories to many exhibits and specimens before gradually winding down. The woman purchases a postcard and t-shirt before departing.

Derek turns to me and says calmly but confidently "for future reference, don't mention anything about art to do with this place, especially that Rich is an artist or working at CMU [Carnegie Mellon University]. He really doesn't want people to think of this as an art project, and certainly not as anything affiliated with a university. Like, he's really clear about it." "Oh", I reply in surprise. "I just thought it would context and background to the Center". "No, it doesn't", Derek asserts, "it confuses Rich's background with the goals of the Center. It's a really big deal for him, so make sure you don't do it again in future". "Alright," I confirm. "So should I not mention anything about Rich at all?" "Well you don't have to be averse" Derek continues "but don't say more than they need to know. Just talk about his role at the Center – nothing more. It's only if he's really pressed he mentions anything about his art background or his work at CMU. He's not trying to hide anything, but he just doesn't want it to be seen as a school art project or something he's done for work because it undermines all of the work he's done to create an open space here".

As the exchange with the woman and Derek highlights, Pell is very careful about the CPNH's framing to ensure its key messages are not lost. He is vehement the Center is *not* seen as an art space, despite him being an artist. He explains how framing can influence visitors' stories and their attention's focus by using an example of a former project, *iSee*, made by his former collective, the IAA. He says "[i]f you identify a project like that as art, then the first questions people have are, you know, 'why is this art?' […] [I]t becomes a conversation about art rather than about surveillance, about privacy, about power" (Pell, 4th interview, 20/05/2015).

In addition to a non-art framing, he is concerned how any one single framing can change perceptions of the space:

> "[W]e try not to have it exist within any single frame […and] the goal here is for you to arrive at your own view that is truly your own. […] [W]e kind of want people to really *create* stories and share their stories, and […] talk out loud about it" (Pell, 2nd interview, 06/05/2015).

It is fundamental the space is viewed as openly as possible to create an audience and for visitors to feel happy to start conversations. For this reason, the CPNH employs CLUI's non-disciplinary approach and attempts to avoid as much codified language as possible, developing a vocabulary "that cuts out as much [sic] of those political signifiers as possible" (Pell, 1st interview, 28/04/2015). The Center's *framing* has a significant impact on its *perception*:

> "We've never taken any money that has any strings attached to it. All the funding we've received has been a matter of *support*. There's [sic] never been any meaningful requirements, a bit beyond maybe filing a report at the end or that kind of thing. […] It is part of our personal ethic. […] We are truly an independent organisation, and that's been really, really essential from the get-go. Even though I'm employed by Carnegie Mellon University, this is not a project of Carnegie Mellon University, and we've kept those worlds very separate. […]. When there's a little Carnegie Mellon logo, or *any* logo, whether it be university or government or commercial or whatever – any of those sign systems – that frames what you are saying. Your whole existence is really dependent on you having a chance to really create the frame yourself in terms of what it means, and trying to get away from the existing sign systems. It's *very* important to us that we not be sharing that kind of sign space with companies, or any organisation, really. […] To us [it] is an essential part of the *kind* of neutrality we're trying to offer" (Pell, 3rd interview, 19/05/2015).

A space projecting a certain opinion attracts people who share that opinion but by removing the opinion in emotionally charged terminology, the CPNH makes the space more open. "By removing all those signs and signifiers, we – hopefully –

create a space in which you have to struggle, […] arrive at your own conclusion, your own framing of it all" (Pell, 4th interview, 20/05/2015). Visitors interested in the content feel comfortable in the space, not being put off by signifiers promoting a view they disagree with. They can engage with the material on conceptual and philosophical levels rather than a deep-seated visceral one with a pre-formed viewpoint, meaning they can appreciate the depth of the CPNH's ideas. Critically for Pell, this stimulates a more inclusive environment where people from different backgrounds can run into each other in an unexpected setting and have conversations. These conversations share and create new ideas, which Pell can contribute to – if asked – by sharing the specimens' stories to inspire curiosity and warrant further visitor exploration off-site in a form of social practice.

However committing to 'neutrality'[282] has meant sacrifices for Pell. Developing and maintaining an image of 'neutrality' starts at the Center's (temporal) beginnings. Pell previously co-founded the Institute for Applied Autonomy (IAA),[283] albeit under a pseudonym, which appeared in several mainstream outlets.[284] The IAA produced political and activist art, which Pell had to distance himself from to craft an image of 'neutrality' for the CPNH:

> "In creating a Center for PostNatural History, it was very important that there be no connection with the Institute for Applied Autonomy, so in terms of our public presentation, our relationship to the media – and even our kind of social network […] we completely started from scratch with the Center for PostNatural History. […] [I]t would undermine the whole premise of the Center for the PostNatural History if we were seen to be a political activist group. […] Whenever the first article gets written, that sets the tone for all the other ones and we needed to make sure that all the journalists were in the dark" (Pell, 4th interview, 20/05/2015).

[282] I put the term 'neutrality' in quotes because this is Pell's term, and a term I critique next page.

[283] Each IAA member, including Pell, was given a pseudonym to enact anonymity, and they had designated spokespeople for interviews.

[284] Outlets included reporting from Wired magazine, and appearances in several academic and non-academic books.

Despite the CPNH's wish to distance themselves from Pell's political past, his decision to found the CPNH is clearly an activist one. He confirms the CPNH's purpose was to have "real conversations about [the postnatural], not just to get people to sign a petition, that sort of thing" (Pell, 4th interview, 20/05/2015), highlighting activism's enduring involvement. Consequently, like at CLUI, the 'neutrality' Pell refers to is undermined by his decision to create the Center at all. Why is this topic important to him? What decisions did he make when deciding how to produce the Center? For Pell however, these are artistic decisions, rather than decisions compromising 'neutrality':

> "On some level the Center for PostNatural History is of course an art project. I teach in a School of Art, you were just looking in my sketchbook which was completely dedicated to the Center for PostNatural History, however it's never identified as an art project. It's a fairly confusing way to present it to people […]. In the same way that we avoid the language of activism, industry, and academia, identifying the Center for PostNatural History as an art project is a rather academic way of looking at it" (Pell, 4th interview, 20/05/2015).

For Pell, then, 'neutrality' doesn't relate to content, but to display. He accepts he is an artist which inevitably leads to decisions affecting the CPNH, such as object collection, but using conversation and framing objects without clear signifiers prevents it being perceived in only one way. Accordingly, the Center has a curious relationship with subjectivity and objectivity. Its displays hint at portraying objectivity, yet it is reliant on conversation and social practice, and thus subjectivity. It wants its bedrock to be seen as objective, a solid springboard to bounce subjective ideas and views around from.

In this way, the CPNH relates to wider moves within artistic discourse to change how artistic spaces, such as museums, are *used*. One example of these moves is Doherty's (2004) 'New Institutionalism' and its use of social practice. While I discussed New Institutionalism's relation to White's work in Chapter Five, it is also related to Pell's at the CPNH. In contrast to traditional museum spaces, New Institutionalism encourages active participation rather than passive consumption;

social practice which Pell uses for his CPNH to inspire conversation and cultivate curiosity. Participants can share opinions and knowledge with one another, fuelling further interest and, hopefully for Pell, inspiring participants to conduct their own research. Whilst the experience at a location-based institution[285] like the CPNH is fleeting and based on visitors' participation, the postnatural extends beyond the participant's stay. The Center is the start of the participant's journey, as CPNH Director of Science and Learning, Lauren Allen, points out:

> "So a lot of what we know about learning in informal environments like museums, is that people don't learn everything there is to know in that space. They find out about stuff that's interesting to them and then they dig into it in all these other places. So like a high school kid comes to the Center, learns about transgenic salmon, becomes really interested in it, goes home looks it up on the internet, talks to their friends about it, […] sees something else about it in the newspaper, they sort of bounce around. […] You're not going to have a deep learning experience in a half-hour visit to a museum, but you might take a step down the path toward a transformative learning experience" (Allen, 1st interview, 19/05/2015).

As Allen highlights, the CPNH is not an information bank about the postnatural, instead seeking to *introduce* visitors to the postnatural concept. Pell agrees, stating that "[The CPNH is] to encourage open-ended research and exploration rather than encouraging focused, narrow action" (Pell, 4th interview, 20/05/2015). The CPNH challenges visitors 'to consider the nuances of human manipulation of the living world and leave with their own answers and new questions' (Pell and Allen, 2015: 224).

From this view, the CPNH reflects its own artistic practice on to participants through research. It uses its research on the specimens, such as their backstories and information about their species, and does so as part of their artistic practice to cultivate participant curiosity. Every species, object, and exhibit in the CPNH has

[285] The CPNH also has a touring exhibition, much of which is currently on display at the Wellcome Collection in London until 21st May 2017 as part of their *Making Nature: How We See Animals* exhibition. They also host public outreach events as well as having online resources, contributing to journals and magazines, and being involved in academic conversations such as those in Geography.

been researched, learned, and presented in a factual way avoiding signifiers where possible. They therefore embody the artistic practice as research framework Mareis et al. (2011) and McNiff (2013) discuss, doing so to encourage participants to conduct their own research and extending Pell's practice in the process.

For Pell, encouraging personal research stems from curiosity which, he argues, can be – and is aimed to be at the CPNH – cultivated:

> "We very much consider [the CPNH] a place that is dedicated to cultivating curiosity. It's practically in our mission statement. […] I think curiosity is all about asking questions, but the power of it […] is that in order for you to care – and I think caring is actually part of being curious – you have to kind of own the question. It has to be *your* question. It can't be handed to you on a piece of paper and then you're suddenly curious about that. You have to at least identify with it in some way" (Pell, interview in Pitt ULS, 2016a).

By cultivating curiosity, the CPNH demonstrates how art spaces are becoming increasingly important in producing knowledge (Esche, in Doherty, 2004). For Esche, this relates to New Institutionalism, which posits art spaces being where new knowledge can be *produced* rather than merely consumed. In this way, spaces of art can be seen to be

> '…starting to describe that space in society for experimentation, questioning and discovery that religion, science and philosophy have occupied sporadically in former times. It has become an active space rather than one of passive observation, […] [providing] less need for the established showroom function' (Esche, in Doherty, 2004: 2).

The CPNH uses their research to experiment with awakening public sensibilities around science and technology. In this way, the CPNH as an artwork is a form of knowledge, educating participants on the postnatural. But it also facilitates further knowledge by cultivating a curiosity in its participants to develop their own knowledge, and by acting as an active conversation space where ideas can be shared and new knowledge created.

Discussions around knowledge at the CPNH prompt reflection on institutions' roles in producing and critiquing knowledge. Last chapter I argued that White's practice as experimenting with the site of institutions is one way of using institutions to engage with science and technology. The CPNH shows, through New Institutionalism, another way; that location-based institutions like museums can also still be used in art for critique and to enact new forms of knowledge. Being a parallel institution, the CPNH engages with existing institutions such as museums but does so using 'instituent practices' (Raunig, 2009) as part of a critical attitude about them. In this way, the CPNH shows spaces like museums can still be part of institutional critique as they can transcend disciplinarity to embody a critical attitude of existing institutions. In the CPNH's case, embodying a museum helps tap into institutional authority to cultivate curiosity which might lead to participants altering other institutions, like at MJT. As the CPNH and MJT show, constructing a museum space as an artwork can provoke public discussion around science and technology, albeit in different forms.[286]

However to cultivate curiosity and prompt discussion around science and technology, in the CPNH's case, requires avoiding activist, industry, and academic language and political signifiers. But, to construct a museum space at all requires it be *recognised* as a museum space. For Pell, he sought to combine these elements, constructing a museum which cultivates curiosity in its participants by avoiding signifiers. In attempting to cultivate curiosity, Pell makes decisions over design, displays, and exhibits, and it is to these considerations I now turn.

6.3. Designing

At the CPNH, design is encountered on two key levels. First, there is the design and manipulation of space in a conceptual sense – part of which was covered in the previous section – and physical sense in the physical building and space. Second, is

[286] At the CPNH, discussion is mainly focused around one particular kind of science and technology, namely the postnatural, whereas the MJT focuses on the science and technology's role in producing and maintaining knowledge.

the process of the specimens' production, the design underpinning their breeding. I now progress through both of these systematically.

On-site, there is minimal writing in the foyer, the visitor left to muse upon the meaning, story and implication of what they experience. The foyer area was the first space visitors entered into. The hollow-sounding floor was painted grey, echoing the walls which were a mixture of greys, black and browns. These dark, neutral and familiar colours gently contrast their hues, resembling the appearance of a natural history museum and a wünderkammer. Non-coincidentally these are the two key types of institutions Pell seeks conversation with,[287] [288] *positioning the CPNH to engage with and/or critique them. However, Pell recognises the postnatural extends beyond two institutional frameworks, stating:*

> "There is a conversation we're interested in having with natural history museums but it's not exclusively about them […]. We're also in a conversation with biological laboratories, [and the] science biopharmaceutical industry [sic]. But we're also in dialogue with the longer history of breeders […] and they don't exist within a single institutional framework. […] And we try to keep all of those dialogues going on, all the time. That's an impossible scale but we try to keep – at some level – parts of those conversations happening" (Pell, 2nd interview, 06/05/2015).

[287] Natural history museums and *wünderkammern*, although potentially linked in their museum function and associated design, can be seen to embody opposing perspectives on materials. Natural history museums are built on the Linnaean classification and seek to order all living things into categories, the distinctions between which are arbitrary (and are highlighted in the *Making Nature* exhibition at the Wellcome Trust). *Wünderkammern* on the other hand are organised with no such standardised rigour, instead being grouped according to the curator's wishes meaning they can often embody eclectic, sometimes nonsensical displays and exhibits. By Pell attempting to speak to both of these types of institutions, he is wanting to open conversations with both of them, but also use his CPNH to spark conversation with those types of institutions with *each other*.

[288] The CPNH's relationship with natural history museums is one I return to later in this chapter.

Figure 38 – Display and layout of the foyer[289]

The layout is carefully chosen, crafted and meticulously planned over and over again with a relentless desire to show the postnatural as thought-provokingly as possible:

> "Originally [Pell] thought the whole Center should be on weird angles. Instead of having three rooms that had walls that are 90º from the side, he had designed it to be in this weird pattern. […] We used so much wood and nails [sic] to make this thing!" (Allen, 1st interview, 19/05/2015)

This relentless desire doubtless continues and it shows. Everything in the space serves a purpose, being chosen and displayed very carefully. Allen states "Rich [Pell] has a vision for how he wants it to look and he has a much stronger aesthetic sense [than Allen]. Every detail is meaningful to him" (Allen, 1st interview, 19/05/2015). Accordingly, fonts are consistent throughout, a central part of the Center's identity:

[289] Source: author's photograph.

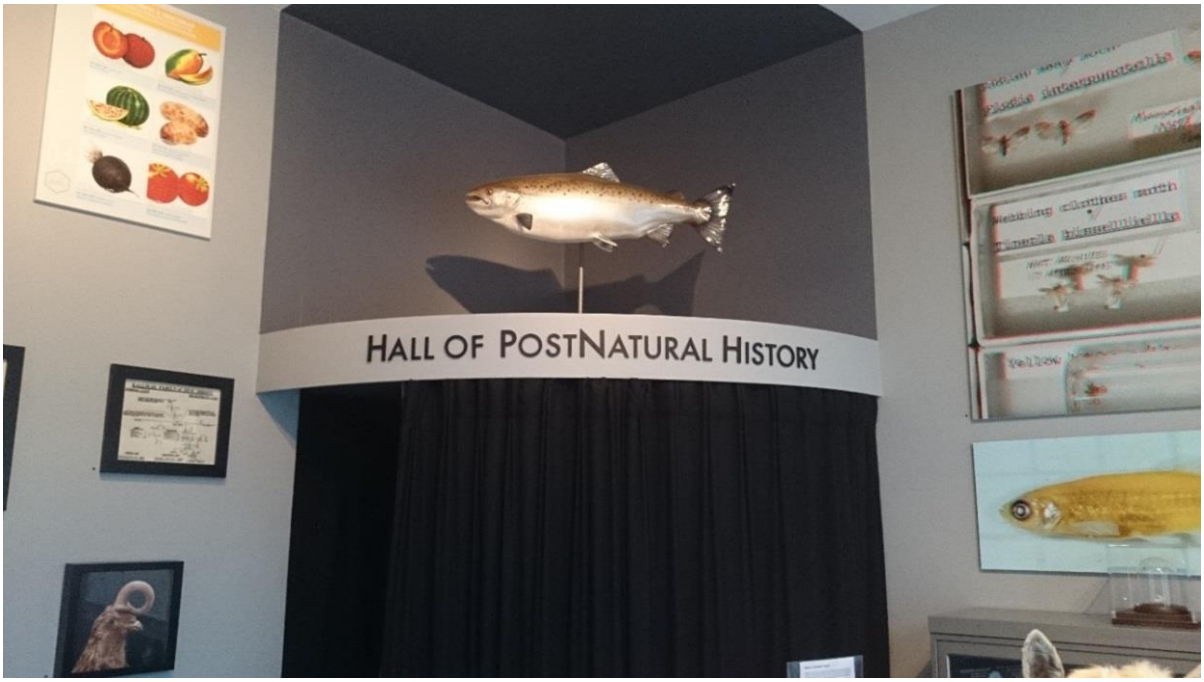

Figure 39 – Hall of PostNatural History sign[290]

Neat and unimposing, this font portrays a calm, informative clarification on the rare occasion information is displayed, continuing the visual aura commenced by the colours. It fits.

I put my bag down and wander off to set the museum up for the day. Pulling back the dark, thick wünderkammer-esque curtain obscuring the entry to the Hall of PostNatural History, I am greeted with total darkness. I dive into this darkness, becoming engulfed by it. Stepping further, a dull luminescence emanates from the glowing fish in a tank to my left. I veer off, and reach for the light switch. Click. The first half of the hall illuminates, and a gentle, humming soundtrack obligingly accompanies. Now I can see. I cross past the sizeable wooden hanging introduction to the Collected From Within exhibition, and scramble for the secret light switch hidden behind a wall mount camouflaged as a block of wood. Click. There we are. The Center is alive.

[290] Source: author's photograph.

Figure 40 – In the Hall of PostNatural History[291]

Looking around, I try to take in all that I see before me, all that I am incredibly lucky to be working with over the next few weeks. It is a staggering sight. This took years to finesse, and looking around, it's clear why. Everything is carefully curated and positioned in a captivating blend of excitement, mystique, enchantment and imagination. Fixtures, display cases, wall-mounts, they too all carry the same considerations, arranged to complement this delicate and canny arrangement.

[291] Source: author's photograph.

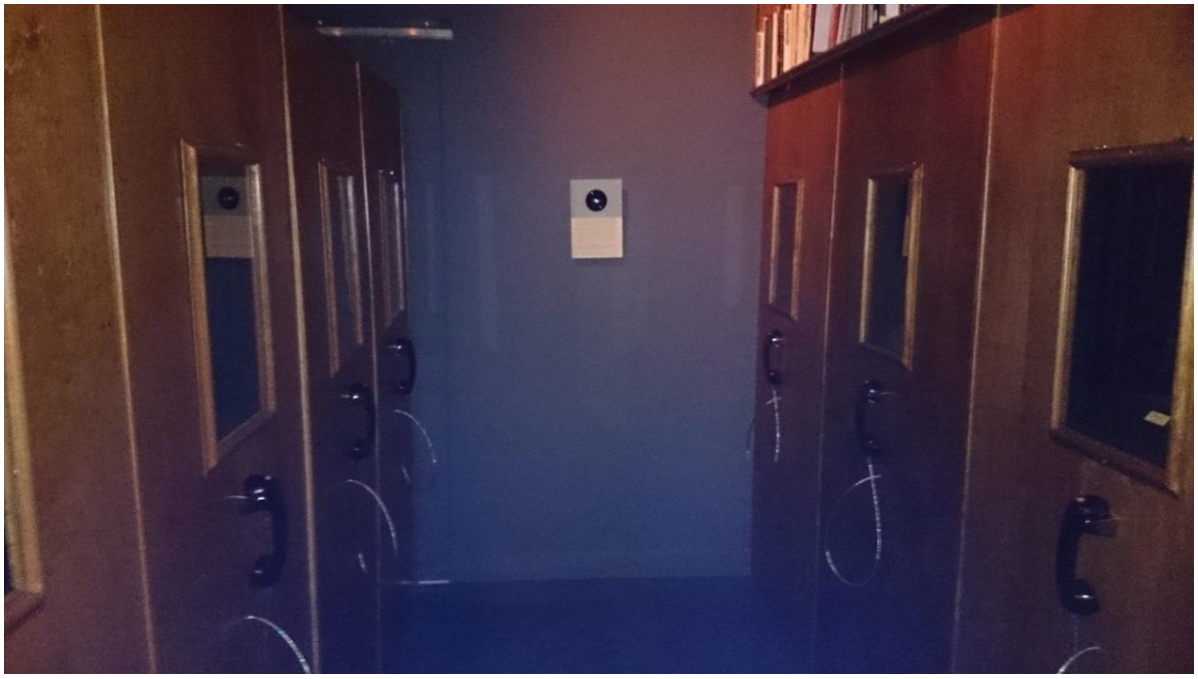

Figure 41 – Hall of PostNatural History aesthetics, seemingly too delicate for my camera to handle[292]

The lighting's positioning is especially important in the Hall of PostNatural History, portraying a lingering air of mystery and intrigue temporarily suspended when a visitor lifts a phone receiver and illuminates the display. Added to this is the audio overlay, a mixture of monotonic sounds of gradually-varying volume and animal sounds such as dog barks, providing a sharp reminder of the postnatural's quotidian ubiquity. Everything fits together. The lighting, the audio, the font, everything. It's ensconcing, and establishes a tone and an identity of the Center.

In the Hall it is atmospheric. Shadows hide in unsuspecting places, beams illuminate the displays, and a cloak of uncertainty greets the visitor upon entering and exiting the hall in a dimly-lit area. The relative darkness represents the mysterious unknown before being slowly lured into the enlightening world of the postnatural. On the way out, this same patch of dim lighting instead provides this feeling in the reverse – now initiated, how will you ***now*** *see the world? For Pell, the postnatural is a lens awakening particular sensibilities relating to the living world previously unawakened. He states that "when you start looking at the world through this kind of postnatural lens, there's things [sic] that you might pass over before that are suddenly kind of interesting in a different way" (Pell, interview in The Influencers, 2014).*

[292] Source: author's photograph.

Leaving the hall, I tug at the curtain, pulling it back to reveal Pittsburgh's brilliant sunshine pouring through the front window. I leave the darkness and step into the enlightened bright sunshine. I'm back in the everyday world but seeing it like I've never experienced before. 'If only everyone could see what I'm seeing' I think to myself.

This spatial design echoing the postnatural's conceptual space was key. On one level, this aesthetic choice for a project aiming to engage social practice relates to Sacks' (2007) understanding of aesthetics as being opposite to numbness; evoking a response to spark conversation, but gentle enough to prevent a defensive response. In using social practice, the Center seeks to engage the Rancièrean understanding of reconfiguring 'sensible experience and its interpretation' (2006: 1), using these designs to shape participant experience and interpretation to reconfigure their sensibilities around science and technology. Accordingly specialist content is carefully curated and displayed, reflected in the CPNH's two main areas: the foyer, as the more introductory and conversational space; and the Hall, housing permanent exhibits and a quiet contemplation space. Yet there is no obvious direction of movement for visitors in either space, or labels identifying anything in the foyer. What are these things? Where does one 'start' in the Center?

This way of experiencing the Center relates to its aesthetics, being optically and visually based on the one hand, but also a particular way of experiencing the Center relating to participant autonomy in art spaces. In his (2008) work, Rancière considers aesthetics as inherently intertwined with art by denouncing a separation of art and its settings. To demonstrate this, he takes the example of the museum. It represents a detachment from the 'common' space, and particular forms of visibility and representation which he argues are 'disconnected from any specific destination, offered to the same 'indifferent' gaze' (Rancière, 2008: 9). Following immediately on from this, he outlines his scepticism for this perception of museums, arguing:

> 'The aesthetic separation is not the constitution of a private paradise for the amateurs or the aesthetes. Instead it implies that there can be no private paradise, that the works are torn away from their original destination, torn away from any specific community and that there is no

> more any border separating what belongs to the realm of art and what belongs to the realm of everyday life' (Rancière, 2008: 9).

For Rancière, art and everyday life appear to be interwoven so effectively they exist as borderless to each other. Far from existing in their own separate sphere, artworks instead exist in everyday life. They are not 'artworks' but simply 'works'. Pell alludes to this in his practice at the Center, arguing that "that idea of doing creative practice that kind of blends in with society and doesn't set itself apart from society by identifying itself as art, has remained throughout" (Pell, 4th interview, 20/05/2015).

For Pell, what Rancière argues is fundamental. For the Center to work as the institution he wants it to, it must blend in with everyday society, hence the museum appearance.[293] If it identified itself by setting itself apart from the everyday, it would be perceived differently. Pell gives an example when discussing CAE's *Are We There Yet?* Project,[294] stating "it was important that the audience didn't see it as art, right? If there was like a little sign that said you know 'this is a performance, don't interfere' or something then it wouldn't have worked" (Pell, 4th interview, 20/05/2015). Had the audience perceived it as the performance it was, it would have changed the project's meaning because they would have reacted to it as an artwork rather than a spontaneous unfolding event. For Pell, the same is true at the CPNH. Its framing and perception shapes participants' engagement with it, and therefore their conversations about it, and therefore its *meaning*. Accordingly, design decisions were crucial.

[293] While museums are to an extent 'apart' from everyday society, they are also familiar spaces which individuals encounter regularly, and represent a useful way to exhibit the material Pell wishes to in a familiar setting.

[294] *Are We There Yet?* was a street theatre project by Critical Art Ensemble which drew on bystanders' unwitting participation to highlight how capitalism affects how individuals use spaces associated with particular capitalist behaviours.

Figure 42 – Audio narration through the telephone receivers[295]

[295] Source: WAAG (2012).

Figure 43 – Public outreach event to inspire conversation[296]

However, design also extends to the organisms' *production*. For Davies (2014), this relates to aesthetics. The scientific process itself, she argues, is aesthetic. Mandelbrojt (2011) relates this to a scientific 'beauty' lying 'in the equation between the instruments and their function' (2011: n.p.). Mandelbrojt asserts there is a particular aesthetic beauty in an efficient process which maximises the instruments for their function. He argues 'a beautiful formula, a beautiful experiment is one that is adapted to its purpose with the maximum of simplicity and efficiency' (Mandelbrojt, 2011: n.p.). In science's pursuit of universal formulae and simplicity, a different but pertinent form of aesthetics emerges. Science's reduction of the world to letters, numbers, and formula establishing an efficient, simple, and reliable relationship between phenomena applicable to a larger, complex network of interactions can be alluring. One can admire the beauty of a controlled, efficient toolkit, working exactly as intended and producing precise results which validate hypotheses.

[296] Source: author's photograph.

Davies (2014) draws on the aesthetics of this scientific mantra, which is essential given the CPNH's role in prompting public discussion of science and technology. Developing this public discussion means building understanding in participants to consider *how* these organisms have been created or altered; mainly, through scientific and technological methods. But another part is recognising the human agents in this process who chose to use *these* methods in *this* particular way creating postnatural ramifications. So understanding aesthetics' relationship with science and technology, is critical in better understanding the CPNH, though Davies argues applying aesthetics in science can be difficult. On the linearity of form and function, future potential and the promise of control and return, she argues

> 'It is not only an aesthetic criterion, but a promise of authority and control. In this formulation, to break the link between form and function, as in the trivial construction of glowing zebrafish pets, is not just in bad taste, it is also an affront to the ontological basis through which science seeks to reproduce itself in this context' (Davies, 2014: 2617).

For Davies, using science to create organisms like the zebrafish I fed[297] – a genetically modified organism displayed at the CPNH – is at once alluring, such as demonstrating authority and control, yet almost an abuse of science and the scientific method. There is an almost narcissistic sense of semi-admiration for humankind's seeming control over our surroundings which is horrific, but to an extent, enchants us. GloFish™,[298] [299] for example, are not just visually pleasing to gaze upon, but also enchanting when mused over their production, evoking a sense of pride in our collective scientific achievements.

For Neal White, this aesthetic fascination in science also includes the visual, arguing scientists to be visually driven:

[297] I explain this experience in more detail shortly.

[298] GloFish™ is the trademarked term for 12 species of fish bred with genes causing bioluminescence. For further information, see Davies (2014). These were formerly displayed by Pell at the CPNH.

[299] Pell has since replaced his collection of GloFish™, predominantly now using tetra fish, a different one of the 12 species used previously.

> "I think the use of visual apparatus in science is actually underplayed massively because it seems scientists are also very visually driven people, often. It's all about observation. There might be data that's produced but unless there's observation they don't get to the data" (White, 2nd interview, 16/01/2015).

Scientists' visual focus White speaks of relates to GloFish™ and their bioluminescence, as well as organisms bred for specific visual traits, such as dogs, or visual habits. Pell gives the example of the Birmingham Roller pigeon, specifically bred to be easily startled when flying. When startled, a pigeon temporarily falls from the sky, inexplicably inspiring others in the flock to do the same for a short period of time before they catch themselves. He explains breeder intentions, stating "the people who breed these animals don't breed them because they don't like pigeons, they breed them because they *love* pigeons. There's something about this that they *love*" (Pell, interview in The Influencers, 2014). So enacting design decisions as part of the CPNH's aesthetics underlies the CPNH's physical and conceptual space, the scientific method used to create these organisms, and the CPNH's careful use of the visual.

6.4. Relating

Rich has to go away for a few days and the running of the CPNH will be left in mine and Derek's hands. We chat, and he goes over the tasks he'd like doing but expresses concern they might be too menial for me to find them useful. I strongly disagree. These are the tasks I find most interesting! They give me the backstage view so often left unnoticed or hidden from sight. Sweep the floors? Check. Water the plants in the front window? Check. Write the Wikipedia entry for 'postnaturalism'? Check. Feed the fish? No problem.

Having done the other tasks, I come to feed the fish. They sit in a horizontal wooden cabinet, the window of which masks the top and side connectors of the fish tank. I gently but firmly pull at the bottom of the cabinet in the place Rich showed me, and sure enough, it lifts right up. A small creak escapes from the hinges as I pull it above

me. I duck underneath it before balancing it on the top of my head. What have we got here? A small light at the top, along with some fish food, a small screwdriver and the wiring from the bulb and fish tank filter. I look at the fish food box. 'For all your tropical fish needs' it has written on it. I look at the fish closely. They're zebrafish, otherwise known in the US as GloFish™. It turns out GloFish™ are the only genetically modified animals legally allowed to be sold as pets in the US, after they were approved by the Food and Drug Agency in 2003. Despite subsequent lawsuits by different bodies including the Center for Food Safety and the International Center for Technology Assessment, these cases were all defeated meaning the fish still remain legal. Yet they are also illegal in the European Union, precisely because they're genetically modified. Consequently, though Rich is asking me to keep these fish alive, the ones he exhibited in the Netherlands in early 2011 had to be deceased to enter the country. He therefore displayed the dead fish suspended in a jar of alcohol, which he'd put in three plastic bags and packed in Styrofoam before transporting them in foam-insulated suitcases.

Given this information, I don't think they can be called 'tropical' fish. Or can they? Though they were once native to the Indian subcontinent, these particular fish swimming merrily in front of me certainly are not. They're from the pet shop down the road. And have been genetically altered somewhere in a lab. But this fish food doesn't seem to have killed them yet. So I take a pinch of flakes and sprinkle them in, closing the top of the tank after. I lift the wood off my head and gently let it down again. The fish gratefully snaffle some of the flakes and continue sauntering around the tank. "I must talk to Rich more about the GloFish™ when he gets back" I think to myself, before turning and leaving the Hall of PostNatural History.

Figure 44 – Zebra fish in a rectangular window[300]

The CPNH is a physical space, of which Pell is its "founder, director, and janitor" (Pell, interview in Makers of the Waag Society, 2012). He mapped out its conceptual space and gave himself the official title of *Curator of PostNatural Organisms*. But, he also draws on additional expertise. One reason why relates to the CPNH's educational function, for which he draws on the expertise of his wife, Lauren Allen, who was trained in biology and environmental studies:

> "He [Pell] had an art and engineering background and it was clear that he needed somebody who knew something about biology to help him! His explanations of how things worked weren't wrong, but they were just a little bit weird. […] I've always been checking the science, making sure the biology is accurate, that it makes sense in terms of what's up-to-date. It's easier for me to dig in to primary research just because I have the background and training" (Allen, 1st interview, 19/05/2015).

In this way, the Center, like other museums, is careful to present researched facts to educate with. It is an educational institution. Allen's expertise are crucial for ensuring the biology was accurate and maintaining the CPNH's credibility as a factual, educational organisation with a view to encouraging off-site learning:

[300] Source: author's photograph.

> "So when I look at the Center for PostNatural History, I see an environment where people learn stuff, and so when we are putting together the exhibit or writing the copy or making the recordings, I'm thinking about how can we set this up so that people will learn the things we want them to learn, or be triggered to seek more information about something" (Allen, 1st interview, 19/05/2015).

By establishing an educational focus, the CPNH is heavily drawing on other museums but uses this position to enact institutional change. Drawing on museum spaces helps accredit the CPNH, enabling it to tap into existing institutional protocols primarily to inspire change in other museums. If Pell can be an accepted voice in conversations between museums, he can have his *views* on how to improve museums accepted. He can therefore alter existing institutions from a vantage point of a parallel institution. He can use his own protocols to alter existing protocols in other museums and associated institutions, without needing to adhere to – and therefore be shackled by (Raunig, 2009) – their protocols.

However, to be accepted into the museum community means adopting certain museum practices in an educational function but also in a physical space. It has a front door, a front desk, staff, and contains different sections for visiting and returning to. It also sells merchandise and embodies museum practices, such as in its design and visuality.

> "Rich calls it the Center for PostNatural History, but we refer to it as the museum. For all intents and purposes it's a museum. […] We do operate like a museum. Museums make travelling exhibits, museums do projects outside of their space, but the flagship thing is the physical space that is the museum" (Allen, 1st interview, 19/05/2015).

The CPNH also has its own collections, its own archives and a library; its physicality is invested in. The expense, painstaking effort and practicalities overcome to create and maintain the Center shows their investment in the space, concept and understanding of it:

> "No one's ever made a dime out of the Center for PostNatural History project. [...] [W]e do it because we want to. […] We get grants and the grants cover maybe the majority of the cost of the project. But we still end up paying for it out of pocket because we feel like we should" (Allen, 1st interview, 19/05/2015).

By having a permanent space dedicated to the collections at a fixed location, the Center shows its investment in terms relatable to other museums. For Pell, the CPNH paged themselves "after a Natural History Museum, [a] famously stable institution [which] invest in marble and stuff [so] you know they're not going anywhere!" (Pell, 1st interview, 28/04/2015).

So in this way, the CPNH purposefully and actively draws on current institutional protocols. But, in a similar way to how CAE embodied science and technology in *Flesh Machine* to highlight their flaws, the CPNH draws on natural history museums to recognise their flaws:

> "I love natural history museums; I visit them everywhere I go. I love […] the absurdity of the project, like collecting every single living thing on the planet including the extinct dead ones all in one place together. […] It's crazier than the Noah's Ark project" (Pell, interview in The Influencers, 2014).

So part of the CPNH's augmentation of museum practices relates to collecting organisms humans have interfered with genetically and heritably, and therefore significantly limiting the project's scale.

Using particular museum practices allows the CPNH to critique them, providing traction for the Center to resist[301] against which is a goal of the CPNH. The museum practices the CPNH draw on relates firstly to physical objects and secondly conceptual space. Many of the CPNH's specimens at one time formed part of natural

[301] Forms of resistance are, according to Foucault (1978) the exercising of power. For power to be exercised, there has to be a resistance to it, the presence being measured against the absence. In Foucauldian terms therefore, the Center's power, in part, derives from its resistance *against* the natural history museum mantra.

history reserve or non-displayed collections before Pell acquired them. Pell has taken these objects and specimens and re-purposed them. Additionally, whilst not explicitly critiquing natural history museums, there exists an *implicit* critique in approach between them which the CPNH exploit:

> "Partly what we're doing is we often describe ourselves as picking up where [natural history museums] leave off. And there's an implicit critique there, that they have intentionally or otherwise edited people – have edited *themselves* – out of this history of life" (Pell, 2nd interview, 06/05/2015).

The Center consequently proposes its own niche which has humans as not just a feature but the central component of, asking cultural questions that natural history museums don't engage with. And these questions extend beyond just the specimens and objects. The CPNH, then, by asking these questions and provoking reflection on the cultural processes of postnatural organisms' creation, resist against the established 'traditional' approach to erasing humans' impacts when documenting the world's specimens which post-Enlightenment museums use.

Recognising their augmentation of museum practices by, for example, not displaying signifiers or labels, the CPNH don't mention the term 'museum' in their official documentation. They are the *Center* for PostNatural History. "I think [Pell] liked the way 'Center' sounded and it's also thinking about [how] a Center can be a more flexible thing" (Allen, 1st interview, 19/05/2015). The flexibility of the term 'Center' refers to their desire of implementing their own practices and protocols, such as self-guidance, having no identifiers in the foyer, and using narratives and allegories in their Hall displays. The CPNH can, and do, set their own protocols. They engage with existing museums, but use this to carve their own niche and critique.

Furthermore, resisting against museums and similar institutions relates to the CPNH's perception of knowledge. Inspired by MJT's critique of knowledge, the CPNH implicitly highlights the complex relationship between knowledge production, museums, and science and technology. Historically, science and technology have been increasingly accepted as certified methods of advancing and producing new knowledge. As museums increasingly moved away from *wünderkammer* eclecticism, they adopted a scientific approach, using the latest scientific and technological

knowledge in their displays,[302] such as Linnaean classification,[303] displaying newly-discovered species, or using newly-theorised explanations and theorems. As such, museums have tended to use science and technology to give authority to their displays and ensure visitor attendance. Accordingly, most museums do not critique science and technology, but instead work in harmony with them.

This harmonious relationship museums have with science and technology is what makes the CPNH so important. By using the practices discussed in this chapter, the CPNH offers participants an engagement with a form of science and technology in a pre-scientific age format akin to a *wünderkammer*. The *participants* decide their viewpoint on the scientific and technological processes which created these organisms, and their cultural use. Participants can decide without an implicit, passive acceptance of scientific method subliminally given to them through the museum's labels, guidance, and design. As such, participants regain their autonomy to decide, in light of science and technology's ramifications – i.e. the postnatural – whether scientific and technical advancements should be used, and if so, how, by whom, and in what context.

Like other *wünderkammern*, the CPNH has its own structure amid its seeming eclecticism. Foyer specimens have a different function to Hall of PostNatural History specimens, for instance. In the foyer, exhibits are to capture participants' attention and ease them into what to expect before entering the main Hall of PostNatural History, where the main exhibits are kept. On participants' way out, the foyer acts as a prompt for thoughts and questions which can be discussed at the welcome desk which Pell usually occupies. This open, introductory space is explained at length by Pell:

> "[In the foyer] we have a constellation of artefacts and specimens with a loose theme holding them together. […] Rather than it being a story about one thing, the story about one thing is usually the story about the one thing that you can't see when you look at it. It's not just a story about a dead

[302] See Geoghegan (2010) for understanding how this high-end knowledge has always been a function of museums.

[303] This point was raised in the *Making Nature* exhibition at the Wellcome Trust, as mentioned in footnotes 276 and 278.

> mouse, it's about the reason for its existence. […] Other exhibits […] don't have any spoken or textual narrative, the narrative just emerges out of the relationship *between* the objects. That's a bit more ponderous, but we were trying to show an inter-relationship, some causalities, and be a bit more open to interpretation and curiosity. So we've got a bookcase here with […] domesticated dog skulls, and right alongside them is a book called *The Visualisation of Dog Standards* which was the handbook for dog breeders that literally determines what is and isn't a pure-bred dog. Then we have the collector's cards, some from the nineteenth century and some from like the 1970s, with again pictures of domesticated dogs on them. […] That *kind* of a relationship between the specimen, magazines, and books […] are artefacts of the culture that has created, in some sense, that specimen; so stereoscopic images, these collector's cards that I mentioned, that kind of thing. So it's just all stuffed together in one display case and […] there's not any *one* story we want people to take away from that. We want people to really *create* stories and share their stories […], that's why it's in the front of the museum which is the more social space" (Pell, 2nd interview, 06/05/2015).

The foyer, then, is a discussion space. The exhibits purposefully have limited (if any) identifiers to prompt conversation.

Figure 445 – Display and layout of the foyer[304]

Using a broad variety of exhibits creates possibilities for participants to interpret and link stories and exhibits together.[305]

Meanwhile, the Hall of PostNatural History contains exhibits whose purpose is to educate. Most of these are mounted in wooden cabinets with viewing windows acting as portals into the specimens' world. Accompanying the viewing window is a black telephone receiver which, when lifted, starts a narration telling the story of the specimen the visitor peers at through the glass.

> "Every specimen has probably countless stories that could be told about it, but it depends on the kind of story we want to tell. There's the cabinets [sic] with the telephone receiver, small spotlight, and those are audio stories that are generally about three minutes long. And that's about the length of a pop song, that's kind of how we think about it. It has about that much content. It's an intimate story, has a good beginning, middle, and end, and it all unfolds over time" (Pell, 2nd interview, 06/05/2015).

[304] Source: author's photograph.

[305] Stories, in particular, are the CPNH's main way of engaging visitors, creating meaningful and memorable ways of showcasing a specimen's postnatural origins and the human decisions underpinning it.

The story lasts a similar time to a pop song, which is "a really good indicator of the human attention span" (Pell, 1st interview, 28/04/2015), and typically involve the specimen's origins, uses and how it came to be where it is today. In the Hall, these stories are purposefully specimen-specific to engage the participant in more depth and relate to the organism. Contrastingly, in the foyer, specimens often represent their species, using generalised stories about entire organisms to provoke broader thoughts about general species and relationships between them.

The Hall also has different types of displays and exhibits, such as wooden cabinets (in Figures 40, 41, and 42), but also long, rectangular windows which have "a paragraph or two of text […] [and] gives you a psychological sense of what is inside the cabinet being larger than what it actually is" (Pell, 2nd interview, 06/05/2015).

The cabinets are the permanent exhibits, and have been extensively researched by Pell. This research is part of his artistic practice, incorporating research into the narratives he seeks to portray. Once researched, Pell then cobbles information together into a coherent narrative which reflects the specimen's history and might be thought-provoking for participants. Research is extensive and thorough, providing detailed information to pull a story together from. Using the example of a PostNatural Organism of the Month (PNOOTM) organism,[306] Chinese Weeder Geese, Pell outlines some of the key questions he'd look to research:

> 'When we talk about postnatural organisms we have to be way more specific. And when writing a blurb like [the PNOOTM], even more specific. You basically have room to tell one good story, but to know what that story is you need to dig a lot deeper. […] [A particular Weeder Geese study] basically describes the prearranged competition of a domesticated species with an invasive one. What came of it? Are there businesses renting out White Chinese Geese to weed your fields today? If not, why not? Other questions that come to mind: Where does water hyacinth [a Weeder Geese primary food source] originate? When and where did it first appear in the US […]? Has this research farm been identified on satellite images?

[306] Chinese Weeder Geese were the PNOOTM for May 2015, which Pell gave responsibility for researching and developing to other assisting, temporary CPNH affiliates and me.

> What is it today? These are all the basic questions I would be asking' (Pell, 2015b: n.p.).

Regardless of which story is told, *every* specimen in the CPNH's entire collection has its own story on how it came to end up in CPNH hands, of which Pell knows all of through his meticulous research.

This section, then, outlines how the CPNH engages firstly with other similar institutions, and secondly the tools used to engage participants. Both physical and conceptual considerations are involved, and suggest a complication of Raunig's (2009) 'instituent practices'. On the one hand, the CPNH borrows design from existing institutions, such as museums, to convincingly mimic them, but on the other hand they are a parallel institution, using their niche to critique these existing institutions. But the CPNH also use their research as artistic practice to cultivate curiosity in participants who, by their use of social practice, conduct their own research off-site. By using social practice, the CPNH indirectly encourage participants to continue their critique of institutions off-site under their own motivation, adding another layer to Pell's parallel institution. It exists beyond the confined spaces of its walls, and represents an opportunity for altering existing institutions.

6.5. Curating

With Pell's meticulous research as part of his artistic practice in mind, how are decisions made about which objects get displayed? Choosing a particular story to tell over another is an aesthetic choice and relates to the CPNH's design. How are these decisions made, and on what grounds? It is to these considerations I now turn.

The act of curating relies on judgements. Knutson (2002) recognises this, stating '[m]useums and museum exhibitions are not neutral – […] in fact, exhibitions are ideologically based and rhetorically complex arguments' (2002: 5; see Bal, 1996; Bennett, 1995; Hooper-Greenhill, 1992). For Knutson, decisions are based on

complex underlying ideological dispositions, which have to be matched alongside the space's themes.

At the CPNH, these judgements include deciding which information to make into stories explaining about the specimen, as well as what story they are trying to convey:

> "There's this process of editing and in that process of editing you leave some of your favourite stuff on the [metaphorical] cutting room floor because it allows other stories to sound even better. And that's a really central process of making an exhibit. […] A central component of telling a good story is what you're leaving out. […] It's not essential that you tell every story. In fact, it's only essential that we tell one really good one in the hopes that you'll want to know more, and you'll go figure that out on your own" (Pell, 1st interview, 28/04/2015).

This opens two areas. One is about archives, the other their curation. I now approach each in turn. 'For an archive to exist', Cresswell argues, 'things […] have to be collected. The act of collecting is part of the act of valuing' (2013: 168), and assigning something value is a personal choice. So too is the act of choosing it, and collecting it. So collections reflect the personal choices taken to collect specific objects. Cresswell (2013) gives an example of French gleaners collecting discarded supermarket potatoes. For gleaners to collect the potatoes the supermarkets have discarded shows differing valuations for the same item, or same principle.[307] But fundamental here is the act of *choosing*; choosing implies valuing one thing over another, this decision thereby underpinning a collection. Pell's decisions mirror the gleaners Cresswell (2013) refers to. A significant part of Pell's collection comprises the unwanted fragments of natural history archives, previously obscured and not displayed. But for him, they are valuable. The same reason they are often obscured – being interfered with by humans – is the reason he *collected* them. Yet these unwanted natural history fragments take centre stage at the CPNH according to their potential use in demonstrating postnatural themes.

[307] What I mean by principle here is that it's entirely feasible for a supermarket to reject potatoes not meeting industry standard, rather than because they don't see them as being necessarily useful for another purpose.

But assessing use is not always easy. How does one achieve consistency? DeSilvey (2007) discovered the difficulty of establishing a collection in amongst a significant archive when commissioned to sort a Montana homestead's holdings. Abandoned, the homestead was overcome with objects from previous tenants. Was she collecting for her personal research project? Was she collecting on behalf of her funders? Was she attempting to give a sample of the homestead's previous tenants' collections? These questions and others shaped what she sought to order and discard; '[d]ecisions about which things to save and which to discard seemed impossibly random' she says, 'and the things I tried to place in the collection consistently disrupted its logic' (2007: 881).[308] [309] As criteria are drawn up to distinguish classifications, this produces gaps and overlaps in the archive between classifications.

> "Any archive that appears to not have any negative space or holes in it is one I would be *very* suspicious of because that seems to be more in presentation than content. Gaps happen for all sorts of reasons, and those are often very, very meaningful. A gap describes something that you haven't yet found, something that you can't find for whatever reason, something that is inaccessible. There's [sic] the gaps that we can't see at all; they're [sic], despite our best intentions, are nonetheless quite obviously there" (Pell, 1st interview, 28/04/2015; [Pell's emphasis]).

Considering these factors, how are classification limits drawn up? For Cresswell's (2013) gleaners, there are physical limits to classification, such as storage capacity. Commenting on a gleaner's collection, Cresswell notices '[a]t the end of the storage area are things too big to fit in boxes or on shelves' (2013: 172). This too is an act of selection, Cresswell questioning how these arbitrary limits are subsequently enforced. The gleaner could get a bigger box to fit them in, but it gives order to, and

[308] Following this difficulty, she invokes the installation art piece by Ilya Kabakov (1998) titled *The Man Who Never Threw Anything Away*. Kabakov's installation was based on a man in the Soviet Union who found distinction between those valu*able* and value*less*, and such an intimate association of memory with objects that '[a]ll criteria for selection became untenable, because everything had a possible future use' (2007a: 886).

[309] DeSilvey's quote here also hints at a temporality of curatorial decisions. Classifications look very different after sorting the first ten objects than they do after the first 100, therefore an object could have its use partly determined by at which point it's assessed.

helps classify, their collection. These physical attributes are therefore given significance because of another decision imposed on them: the size of the boxes and shelves. If this was not the attribute chosen, or if in and out of the box wasn't the deciding factor in the collection, the physical size would become *in*significant unless it was used to judge against something else.

Cresswell's gleaners' example highlights how arbitrary distinctions can be, yet these distinctions and the criteria's implementation[310] alter and refine the collection. For Withers (2002a), amalgamating these successive decisions shapes the archive; selection and conservation not only preserve but *produce* items they allege to have responsibility for. *How* collections are kept and ordered *constitutes* the archive, meaning collections are inevitably fragmented[311] (Mills, 2013). This fragmentation of archives relates to their institutional history (Derrida, 1995), being fragments of institutional decisions permitting their survival. An institution's keeping and ordering of archives not only constitutes the archive, but also refines the archive from all objects potentially being in a collection to only those collected.

Curating displays further refines objects once more,[312] and at the CPNH, the number in the wooden cabinets with an audio narration of their story further refines this amount again. Yet each object has its own story, and, in the CPNH's case, one that Pell knows. So how can he decide? At institutions, rarely is curation solely an individual decision.[313] However, given Pell's key role at the CPNH, his personal decision overrides others' if necessary.[314] For this reason, these decisions are even more critical and must be carefully justified. Oftentimes, decisions about displays relate to the institution's framing and character. Some stories, although interesting,

[310] To follow on the gleaners' example here, this implementation is deciding being in or out the box determines whether an object's kept.

[311] Collections become fragmented because they cannot accommodate for all possible selection criteria and possible combinations of implementing these across all potential objects.

[312] It refines collections down from those in institutional holdings to those on display. At large institutions like London's Science Museum, this can be as low as around 5% on display, leaving an incredible ~95% not being displayed at any one time (Geoghegan and Hess, 2015).

[313] Though Barrett (2014) argues there is a recent trend among larger institutions to allow more individual freedom when curating displays.

[314] Given the CPNH was Pell's vision, he has final say on whether suggestions are acceptable or might compromise any aspect of the Center.

might contradict key points or themes, while others might not be memorable enough to justify having that story told:

> "There's [sic] all sorts of reasons [why one leaves stories out]. It's not a matter of censorship; you're usually leaving something out for more of a sense of timing. You're trying to get from one idea to another in a meaningful, memorable way. It's like a sense of rhythm" (Pell, 1st interview, 28/04/2015).

Most importantly, Pell ensures decisions remain in the Center's character. While there are particular zones, such as the foyer and the Hall of PostNatural History, the CPNH seeks to showcase stories that draw on many different actors, places, historical time periods, and future possibilities to reflect their institutional framing:

> "We do appropriate a lot of the aesthetics of natural history museums […]. We try not to over-do that. […] But we use a little bit. The hardwood cabinets, things under glass, but not exclusively; […] ideally each section of the museum that you go through would exist in a different kind of aesthetic regime, so that you've got some of the cues of biotechnology happening in certain places, you've got some of the cues of folk knowledge, of breeding and animal husbandry, […] and then the rest of it that exists in this darker space that's a little bit more in a similar earlier time. But not all of it. There's [sic] different parts of it that are clearly contemporary and parts of it that are clearly historical but we try not to have it exist within any single frame, that's the thing. If there's only one way of looking at things then we need to kind of break that and violate that" (Pell, 2nd interview, 06/05/2015).

Picking specimens to fit this complex framing is every bit as tricky and complex as the framing. This complexity also mirrors the postnatural's cross-disciplinary focus. Postnatural organisms came about from successive decisions relating to using particular scientific and technological processes in particular ways. These decisions were not bounded by disciplines, spanning politics, economics, social and cultural norms and desires, and even concerns about the future. Implications from these decisions also span these areas and more. Curation is therefore essential to help

inspire interest and generate discussion among participants around the ramifications contemporary science and technology might lead to in the future, and their breadth. However, while there is a degree of flexibility in the specimen's narrative pieced together, it is also shaped by that specimen's history. The object itself, then, also has a role to play, which I now consider.

6.6. Enchanting

In this section, I turn to consider the final of the five key facets of the CPNH's aesthetics in experimenting with public discussion of contemporary science and technology: the objects. In doing so, I aim to explain how the Center uses objects to cultivate a curiosity as part of mobilising social practice. How do the objects contribute to prompting discussion about science and technology?

At the CPNH, they only have resources for a handful of permanent exhibits with detailed audio stories overlaying them. Their other exhibits are either unlabelled or have minimal writing. To convey stories or use them to cultivate curiosity, the CPNH instead use a combination of conversation and taxidermy.[315] Conversation primarily happens after visitors have been round the foyer, Hall, and reconvened in the foyer, meaning taxidermy is the primary method for conveying meaning. And many of the permanent CPNH specimens are taxidermal, suggesting Pell sees taxidermy as justifying its high cost.

The CPNH draws on Baker's 'botched taxidermy'[316] (2000) understanding, the dioramas representing tools to think *with* rather than necessarily thinking *about* the specific specimen. For Pell, these objects physically show the postnatural in action. Their bodies can act as markers, showing the complex histories and decisions taken

[315] The CPNH uses a variety of media for displays, including (sometimes 3D) prints, images, books, cards, wall mounts and newspaper clippings, in addition to taxidermy. Where the opportunity allows, however, taxidermy tends to be used.

[316] Baker (2000) defines botched taxidermy accordingly: 'a botched taxidermy piece might be defined as referring to the human *and* to the animal without itself being either human or animal, and without its being a direct representation of either. It is an attempt *to think a new thing*' (Baker, 2000: 75 [original emphasis]).

as part of the postnatural (see also Patchett and Foster, 2008; Patchett, 2008; DeSilvey, 2006):

> "Part of what we're doing necessarily involves presenting dead animals. So adopting some of the aesthetic cues of the natural history museum [like taxidermy] makes a certain psychological sense because we're certainly not here to shock people with dead animals. So starting with something familiar is just an important way of getting people to ease them into the conversation" (Pell, 2nd interview, 06/05/2015).

Taxidermy, for Pell, is a chance to stimulate conversation through a familiar practice which relates to how humans as animals perceived of other animals. This familiarity, both with seeing taxidermal specimens and the species they represent, means they can reflect on the postnatural processes and decisions underpinning the specimens' production. Pell states "maybe it's because we are mammals, we [humans] kind of respond to them [animals] differently to just seeing a pressed flower. We're just a little bit keener at identifying the differences between animals" (Pell, 2nd interview, 06/05/2015). To accentuate certain points, Pell can choose taxidermal poses for dramatic effect. A good example is his recent *Domestication of the Dinosaur* exhibit, shown below:

Figure 45 – Taxidermal specimens[317]

This exhibit has the fallen bird at eye height, allowing the participant to gaze up at the victorious and intimidating bird leaning over it, like the defeated bird would be. Using striking and thought-out poses, therefore, can powerfully translate meaning, stimulating thought and reflection on displays.

[317] Source: http://www.postnatural.org/Domestication-of-the-Dinosaur.

Figure 46 – Alcoholic rat from a laboratory in Finland[318]

[318] This alcoholic rat, from the CPNH's *Specimen Vault*, is one of a series of rats bred to choose alcohol over water when given the choice. It was researched as part of a Finnish study into researching the effects of, and possible solutions to, alcoholism, which is a large problem in Finnish society.

These objects, then, have their histories pieced together and told through narrative (see Cook and Woodyer, 2012); these histories are told as much from the narrator's perspective as the object's (see Pels et al., 2002).

The combination of aesthetics and objects in the CPNH space evokes what Bennett (2001) describes as 'enchantment'. For Bennett, enchantment is an experience of being '…struck and shaken by the extraordinary that lives amid the familiar and everyday. […] [E]nchantment entails a state of wonder […] a momentarily immobilizing encounter; it is to be transfixed, spellbound' (2001: 5). Unpacked further, it considers the feeling of 'being disrupted or torn out of one's default sensory-psychic-intellectual disposition' (2001: 5) and thrust into a state of almost captivating bewilderment. Such enchantment and bewilderment is Pell's intention, invoking the *wünderkammer* age but also unsettling clear ways of interpreting the space.

> "…different parts [of the CPNH] are clearly contemporary and parts of it […] are clearly historical but we try not to have it exist within any single frame. If there's only one way of looking at things then we need to break that and violate that. […] It's a psychological technique I guess. The goal here is for you to arrive at your own view that is truly your own" (Pell, 2nd interview, 06/05/2015).

The Center, then, uses this bewilderment for participants to arrive at a destination that makes sense to *them*, being their personal way of making sense of what they have experienced.

In this way, the CPNH draws on Human Geography's predominant engagement with enchantment, which has been to 'express delight, wonder or that which cannot be simply explained' (Woodyer and Geoghegan, 2013: 196). Enchantment's manifestation in the everyday and the familiar (Bennett, 2001) speaks to the core of the CPNH, enlightening participants regarding the postnatural's ubiquity and quotidian existence. To make these everyday organisms memorable, the Center resists against typical museum approaches by designing and positioning exhibits to be disruptive and *distinct* from other similar institutions. For Pell, "…we're constantly saying this *and* this – also *this*, and *this* […]. Each exhibit is supposed to kind of

puncture and expand the notion of postnatural that the exhibits before it kind of established" (Pell, 2nd interview, 06/05/2015). Each CPNH exhibit therefore provides the context *for* but at the same time punctuates the context *of* not just other institutions, but other CPNH exhibits. They are at once constituted *by*, *and* disrupt how other exhibits are constituted.

For Harvey (2005), exhibits' contexts are partly shaped by other visitors and their responses to them, which then influence reactions to other exhibits. According to Harvey,

> '[o]bjects in museums do not have the intrinsic capacity to enchant. Visitors need to be drawn into relationships with them and the skill of those who put the exhibition together is to find a way to articulate that relationship that both attracts and educates' (2005: 31).

So although objects are part of the enchanting experience, or indeed 'play active roles […] and are part of the mutual constitution of biographies involving associated people, place and objects' (Hill, 2007: 73), they are only partly responsible.[319] The objects represent an embodiment of that specimen's unique story, which are then used to initiate conversation and the flow of ideas. These specimens act as the crystallising points of past events in time and space, the material embodiment of a particular backstory. Interpretation, thought, and questions from then onwards is over to the participant. For Pels et al. (2002), material objects epitomise those connections and flows not static enough to be represented. 'Material objects', they write, 'are enactments of strategies, and actively participate in the making and holding together of social relations' (2002: 11). By using social practice, then, Pell makes use of this by emphasising conversation to constitute participant meaning and generate understanding and personal affiliation for the objects.

For Pell, the decisions made as part of scientific and technological processes have already provided every postnatural organism, and enchantment through a familiar

[319] Several others have made similar points regarding the relationship between objects and their constitution from social relations (see Bennett, 2010; Withers, 2002a; Hetherington, 2001).

method of display such as taxidermy represents a good way to prompt discussion about these scientific and technological processes:

> "[After Darwin's theories] [Western societies] separate out the rational from the non-rational and we have the art museum over there and the natural history museum over here. […] It is within that space I find myself, that [sic] I found the need to create this museum that was ultimately about nature and culture and where they overlap, the parts that get excluded from either part of that conversation. And it's the stuff that, if you go back 200 years, would have obviously been in a *Wünderkammer*" (Pell, interview in Pitt ULS, 2016a).

Objects' enchanting possibilities were a part of *Wünderkammern*, being 'arranged in such a way as to inspire wonder and stimulate creative thought' (Putnam, 2001: 10). At the CPNH, like at MJT, drawing on *Wünderkammern* helps cultivate curiosity. The Center embodies both the natural history museum-style 'status quo' by displaying what science and technology has already done, and provides the tools to question it.

> "I link [curiosity] with scepticism. I link it with really the scientific method itself; at some point it starts with a curious impulse that you create a hypothesis about. […] Curiosity is inherently a threat to the status quo. […] The status quo is always saying 'this is how it is' and curiosity is always asking why. […] I think curiosity is all about asking questions […] [and] you have to be free to think about it in your own way […]. [T]here's an infinitude of conclusions that can be drawn" (Pell, interview in Pitt ULS, 2016a).

Pell later follows up by stating "I think 'why' is the most powerful question in the world" (Pell, interview in Pitt ULS, 2016a). Here, he touches on two key points. The first relates to *understanding* what science and technology has produced in the living world in ways often unnoticed. The CPNH shows "this is how it is" (ibid) using curiosity to relay information in a way that's informative and empowering. As Chapter One shows, science and technology has a long history of being seen as conducted by 'experts' and eventually filtering down to non-experts. Accordingly, laypeople felt disempowered from science and technology and disconnected from its practitioners,

as Callon et al. (2009) alludes to. But this also justified exonerating responsibility, laypeople believing their actions were independent from either using or funding research in science and technology. Accordingly, educating visitors about the postnatural is the first step.

The second relates to social practice. Curiosity transforms CPNH visitors to realise *they* are contributing to how science and technology is used. It is not rolled out by experts for consumption; every person's consumptive practices influence scientific and technological research and its application. One example is the alcoholic rat shown earlier, researched and bred to help pursue treatments for alcoholics. Another example is what Pell discussed in his (2015) talk: "[On showing the scale of concentrated animal feeding operations[320] [CAFOs] on Google Earth] This is what one dollar hamburgers look like. When [people] buy them we're saying we want more of this" (Pell, 2015). This link to empowerment is where Pell draws a distinction between what the CPNH attempts to balance: wonder and curiosity. This is a balance which the CPNH must be careful to strike to be consistent with their aims. For Pell, to wonder is almost to marvel at something from afar, conceding powerlessness. Yet buying practices like these influence relationships with the living world to fit consumer desires. Individuals are certainly not powerless. They can shape entire business practices, inventions, and by extension, human – and living world – evolution. They are participants, yet public understanding does not always mirror this. For Pell, cultivating curiosity helps solve this by asking why, and being personally motivated to find out more and acknowledge their role as participants.

> "Wonder […] is linked to awe. […] It's all about that experience of wonder, that humility. It inspires devotion, sacrifice; a lot of different things can come out of that sense of wonder. And sometimes curiosity is one of them but it doesn't have to be. Curiosity […] has a meddlesome history. People have been a little fearful of curiosity in the past. An Italian iconographer named Cesare Ripa said that 'curiosity is the unbridled desire of those who seek to know more than they should', and that was in 1593. When I think of wonder – wonder is perfectly happy to visit the land of Oz, and

[320] CAFOs are mass-scale factory farming of large animals, especially cattle, for meat production.

behold the great and powerful Oz. But it's curiosity that goes and peeks behind the curtain" (Pell, interview in Pitt ULS, 2016a).

In this way, the CPNH experiments with public discussion of contemporary science and technology. It firstly makes visitors aware of the practices of science and technology, and then highlights their active role as participants in shaping these practices to encourage public discussion.

Figure 47 – The manifestation of these ramifications; specimens from the 'Specimen Vault'[321]

So that was it. My six weeks were over and my eyes were open wider than they had ever been before. I felt like I had known about the postnatural my whole life, a testament to how well Pell and the CPNH had done in making such a complex, global, and historical phenomenon seem so obvious. Stepping outside, I brought in the heavy, wooden, dark grey sign advertising the CPNH as open, and leant it against the wall in the foyer. I tugged the net curtain across the front window, and turned to disappear out into the Hall, switching off the lights. A darkness enveloped me once again, and the gentle audio soundtrack ceased. Clunk, clunk, clunk went my shoes against the wooden floor boards as I peered round the curtain and back

[321] Source: author's photograph.

out into the foyer. I stood alone with my thoughts a minute. There had been so much to take in over the last six weeks. I wasn't sure where to begin piecing together my research. It felt like a founding moment, and I sensed the ramifications of this Center will extend well, well beyond this thesis in the future.

Figure 48 – A closed Center for PostNatural History[322]

6.7. Closing

This chapter shows several things. First, it traces the physical and conceptual space of the Pittsburgh-based CPNH by focusing on five key considerations: framing, designing, relating, curating, and enchanting. Using its position as a parallel institution, these five considerations show the CPNH as experimenting with the functions of an institution like a museum to prompt public discussion about contemporary science and technology. The CPNH have been shown to be especially interested in the *ramifications* of science and technology, largely because of their interest in postnatural organisms which are the ramifications of breeding decisions made over thousands of years by humans. Further, postnatural organisms have their

[322] Source: author's photograph.

genetic trajectory altered, which has evolutionary consequence for that organism, their associated food webs, and other organisms implicated in these chains.

On the one hand the CPNH draw on the educational function of a museum, using stories, dioramas, and conversation to educate and help understand how the scientific and technological processes were used in producing these postnatural organisms. On the other hand, they use the MJT-esque, *Wünderkammer* style and a CLUI-esque non-discipline voice to cultivate participant curiosity and encourage further exploration to fully understand the role of science and technology in producing postnatural organisms, and where participants themselves have a role.

The CPNH's mission of advancing knowledge uses artistic practice as research, and portrays the CPNH as an artwork which acts as knowledge (White, 2014). It is non-disciplinary, encourages conversation from diverse practitioners, and also uses social practice to show participant's role in producing postnatural organisms, motivating them to explore further and make decisions in their own time. In these ways, it brings together a range of individuals across backgrounds, expertise, and understandings, to force thought on a particular situation (Braun, 2015), representing a fantastic example of how an experimental approach can help provoke reflection on existing situations and produce new forms of knowledge on institutional and personal levels.[323]

[323] The personal level I refer to here relates to the participants' ability to decide how they feel about the postnatural specimens presented in front of them, and their ability conduct their own research off-site, having been inspired by the CPNH.

7.0. Conclusions

7.1. Introduction

This thesis has sought to showcase the creative opportunities artists can bring to understanding the way individuals can engage with institutions. As recent political decisions in the UK and US have shown, understanding the way institutions can gain (social) traction is becoming increasingly important to combat the challenges of discrediting knowledge validity and keeping public engagement with science and technology transparent, open and sustained. As these challenges manifest, so new demands are asked of institutions to adapt, partly through experimenting with new forms of knowledge and with new forms of institutions, as well as garnering a better understanding of existing institutions and their (mis-)management. The artist-led groups and artists included in this thesis represent a way of showing alternative ways of understanding and experimenting with new forms of knowledges and institutions. These artist-led groups and artists have also offered publics new ways to engage with existing knowledges and institutions, such as through parallel institutions, which offer one way of meeting these new challenges.

In this chapter, I state the key contributions to knowledge the thesis makes, concluding its key arguments. In this thesis, I have used artist-led institutions as a way to show how new spaces for engaging contemporary issues in science and technology can be created. I framed this contribution around experimental geographies, arguing that experimental engagements with science and technology among the artist-led groups I discussed have involved relationships with institutions. For some groups, they used different and complex relationships with institutions as a way of engaging with different aspects of science and technology. For others, notably White and Pell, they used their own artist-led institutions rather than complex relationships with other institutions for this purpose. Institutions, then, were the medium through which the thesis sought to explore these artistic practitioners' engagements with science and technology as a way of opening conversations around how different forms of knowledge might be produced.

This concluding chapter is split into five main sections. First, I commence by recapping the main arguments of each chapter, stating the thesis' research aim and

questions, and explaining what each chapter does and how they further thesis arguments. Following this I outline the key contributions to knowledge the thesis makes in two key ways: 1) around experimental geographies and 2) around institutions and knowledge. These key contributions then lead on to a section which deals with the challenges, possibilities and limits of using art which engages with experiments, providing evaluation of the potential beyond this thesis of using such art.

In the fourth section, I move on to outline three main avenues for future research which this thesis could act as a foundation for. These include potential contributions firstly towards repeat fieldwork as a way of assessing key practitioners and spaces in further depth; secondly, involving artistic practitioners from beyond the network I mapped; and thirdly, exploring how the creative approaches outlined in this thesis might help negotiate future complex geographical issues. The final main section takes a step back to explore the wider connections between art, science, and politics, and posit what current political and economic decisions might mean for artist-led institutions in the future. I then conclude the thesis with some brief final remarks.

7.2. Chapter review

In this section, I proceed chapter-by-chapter and explain each chapter's key contributions to the thesis.

In Chapter One, I set the research area by drawing on experimental geographies to explain where the thesis contributed to geographical literature. I outlined the conceptual and epistemological changes in recent nuanced experiments to increasingly open, inviting experiments characterised by forcing thought on situations (Braun, 2015). I argued the experimental turn is an opportunity many had already seized (Hawkins, 2015; Kerr, 2008) to incorporate creative methods and practices into situations, producing new forms of knowledge. Notions of expertise, authority,

and the sites and media[324] of experiments, I argued, were changing in the experimental turn's aftermath, implicating these aspects of knowledge production.

Recently, experiments have manifest in two particular contributions within Geography: the *geographies of experiment* and *experimental geographies*. As art has become increasingly used in both of these contributions (Kullman, 2013; Last, 2012b), so its contributions to non-artistic research have become increasingly valued. I used examples of artists Neal White and Richard Pell, both of whom are involved in a conversation becoming progressively heard in Geography around experiments, to explore the geographical importance of their experimental practices. I showed how their created institutions emblematise artistic practice as research[325] on science and technology, subsequently representing artworks being used as knowledge (White, 2014) to force thought on situations implicating visitors as participants.

Having set the thesis' context accordingly, I stated its research aim and questions. The thesis aim is:

> **To explore the emergence of artist-led institutions as new spaces for engaging contemporary issues in science and technology**

To help guide my contributions towards this aim, the thesis has three research questions. These are returned to in the upcoming summaries of Chapters Four, Five and Six and these empirical chapters explicitly relate to these questions. Around the aim and each of the questions I then explained what each one sought to do, and how they would be explored as the thesis unfolded.

Given art's role in recent experimental conversations, in Chapter Two I explored recent discourse around art and Geography engagements. I showed how previous engagements between art and Geography have focused on three key notions

[324] My use of 'media' is the plural of 'medium'. It is not intended to refer to the media as a collection of press and other journalistic outputs.

[325] Here, I argue that by producing their created institutions, White and Pell have used artistic practice to create institutions which conduct research, and this research is a function of their practices.

involved in practices relating to the media of experiments: artistic epistemology,[326] as well as materiality, and aesthetics. I also showed how these art-Geography engagements have experimented with different locations, notably using social practice and institutional critique to explain the changing personnel and sites of experimentation. The chapter argued the practices and locations used in previous art-Geography engagements have offered experimental ways to conceive of, use, and alter institutions, ways which this thesis draws on to explore artists and artist-led groups' engagement with science and technology's contemporary issues.

Chapter Three considered the research methods for empirical research into the practices of the thesis' artist-led groups, as well as Neal White, and Richard Pell. Empirical research into these complex, artistic engagements with science and technology, Chapter Three argued, required geographers to use a methodology in a new context to explore experimental approaches to institutions in artistic practice. It argued this by using a mix of ethnographic methods, including to assist in producing an exhibition and to help maintain an institution.

In tracing the network of artist-led groups I blurred the distinction between researcher and participant, notably when contributing to White's *CoC* project. I contributed to this project to research his practice, embodying a form of the artistic practice as research notion Mareis et al. (2011) and others (McNiff, 2013) have discussed. I acknowledged that although I was researching the network I also provided linkages between them. In researching Pell's practice, I also became a participant in his social practice institution, conducting research on the postnatural as part of my duties during my stay. These experiences gave me understanding of how artists implemented their practices in engaging with institutions; for the artist-led groups, it related to how *they* engaged with institutions, though for White and Pell it related to how their institutions engaged with different aspects of science and technology.

Chapter Four began the first of the three empirical chapters. It sought to answer RQ1, which was:

[326] Epistemology, in this context, I take to mean the artistic processes and practices for knowing; that is, exploring how artistic practices can be used in processes of knowing.

Research Question 1 (RQ1): How have artist-led groups experimented with different modes of institutions to publicly engage with contemporary science and technology issues?

This chapter mapped the contributions of five key artist-led groups – Artist Placement Group (APG), Arts Catalyst, Critical Art Ensemble (CAE), Museum of Jurassic Technology (MJT), and the Center for Land Use Interpretation (CLUI) – in engaging with science and technology. Each of these groups experimented with institutions in complex and differing ways, which mapped onto corresponding waves of institutional critique. I showed how APG's work inside government and public institutions during the 1960s-1990s helped re-position art in society. APG critiqued how artworks and objects were framed on the one hand, and the role of the artist and the spaces for their work in society on the other. In this way, they correspond with the first and second waves of institutional critique. By exploiting institutions in this way, art gained higher regard across society, becoming invited into conversations, such as those happening in Geography, around traditionally non-artistic topics like contemporary issues in science and technology. Pioneering organisations like Arts Catalyst helped solidify this position, acquiring funds, resources, and personnel for art to engage with contemporary issues in science and technology. They used their contacts from inside research institutions to generate funding for projects engaging with art and science, and in doing so create new ways institutions have perceived of art. Arts Catalyst therefore relate to the third wave.

In the US, CAE sought to tactically strike against key institutions through using Tactical Media.[327] They built on conceptual developments made by groups like APG[328] in highlighting art's usefulness to society[329] in communicating key messages and provoking conversations. CAE conducted experiments in public to prompt critique on other institutions involved in science and technology which, they argue,

[327] TM advocated interdisciplinarity and questioned the associated elitism often associated with art (Sholette, 2003) and with science (CAE, in Schneider, 2000).

[328] In an interview with me, Kurtz cited CAE's key influences as *Situationiste International* and *Group Material*, both of whom started to question the public perception of art in public spaces through activist and provocative works.

[329] CAE used a different approach to APG in showing art's usefulness to society. CAE used it to provoke conversations and critical thought about key issues, whereas APG used a more direct approach by integrating artists into the workforces of key organisations and encouraging discussion of their practices.

results in a narrow distribution of scientific expertise and problematic alliances with business, such as in pharmaceuticals. In this way, they invoked the second and third waves of institutional critique to critique how science and technology engaged with powerful institutions. However, Steve Kurtz's four-year court battle with US authorities also showed the difficulty of attempting to alter existing large-scale institutions through critique. MJT, meanwhile, uses the third wave[330] in exploring how particular kinds of institutions produced particular cleavages in knowledge.

MJT's existence, alongside CLUI's, however, also relates to the fourth wave, a 'parallel institution' created to critique other institutions by setting its own protocols. Both MJT and CLUI also engage with aspects of science and technology directly by using artistic practice as research. Both MJT and CLUI conduct their own research, deriving research from their artistic practices. Further, MJT and CLUI's form of artistic practice as research inspired both White and Pell when producing the OOE and CPNH respectively. Inspired by their predecessors, White and Pell also relate to institutional critique waves. White simultaneously uses both the third and fourth waves of institutional critique, critiquing the process of institutionalising by exploring how institutions come into existence to produce his parallel institution, the OOE,[331] whereas Pell draws on critiquing perceptions of art in the second wave for his parallel institution, the CPNH. Mapping these artist-led groups helped trace the genealogy of White's and Pell's practices, with both drawing extensively from concepts and methods of these groups. The influences of APG, Arts Catalyst, CAE, and CLUI on White, and CAE, MJT, and CLUI on Pell contextualised their respective practices among conversations around social practice, institutional engagement and aspects of science and technology.

In Chapter Five, I focused on White's practice, which related to RQ2. This was as follows:

[330] The third wave of institutional critique refers to critiquing the process of institutionalising.

[331] The OOE doesn't just stop at the fourth wave however, but integrates instituent practices into its approach.

Research Question 2 (RQ2): How does Neal White, and his artist-led parallel institution, the Office of Experiments, use artistic experiments to critique social and spatial aspects of science and technology?

I therefore sought to explore how he used experiments to critique two key aspects of science and technology: the social and the spatial. I used his recent *Sites of Excavation and Construction* exhibition, which I assisted in the production of, to frame key parts of his practice which he explored in four other OOE projects. Each of these projects represented a different way of engaging with site. I used *Dark Places* to show how White uses his trademark kiosk as a temporary site to spur participant conversation and action via an online (web)site; *Truth Serum* showed how he used a non-scientific space for an art project embodying a former scientific experiment outside the confines of a laboratory; in *The Void* White *changed* the site of experimentation to a non-scientific one which he brought visitors *to* for them to witness an experiment often not publicly accessible; and finally the *Secrecy and Technology* bus tour sought to *expand* the sites of experimentation, including sites otherwise secretive or whose purposes might have been unknown to participants. I argued that in addressing these four different ways of engaging with sites, White also experiments with the social imaginary of science, tapping into particular conceptions of different parts of science at different sites.

In using site, I highlight how the OOE use a geographical concept to ask critical questions of science and technology by reflecting on White's exploration of how science is perceived in the social imaginary, a key part of institutions. White experiments with participants using social practice to link together the role of the informational and the experiential in influencing perception. Throughout, he uses his artistic practice as a form of research to critique knowledge. Using the OOE to conduct these experiments allows White to set his own parameters and protocols at his own parallel institution, asking critical questions of an aspect of science and technology on his own terms. In doing so, White contributes to a critical discourse about the roles of firstly science and technology experiments and secondly artistic practice in knowledge production.

For Chapter Six, I returned to RQ3. This was:

Research Question 3 (RQ3): Through what means does Richard Pell use his artist-led parallel institution, the Center for PostNatural History, to experiment with public understanding around science and technology?

To answer RQ3, I used Pell's CPNH to show how he experiments with public discussion around a different aspect of science and technology, namely the public understanding of the processes involved in science and technology as manifest in the postnatural. I showed how the CPNH uses different types of displays, exhibits, and paraphernalia to inform participants about the postnatural, a concept produced by humankind's use of science and technology throughout history. Pell's use of artistic practice as research was highlighted in two ways: firstly, Pell's practice influencing the CPNH's research, whose use of stories questions the processes of knowledge production, and secondly by inviting participants to conduct their own research.

The five key aspects of the CPNH I drew on[332] represented five ways the CPNH sought to experiment with public understanding around science and technology. Each way represented a different way of experimenting, with which particular props encouraged discussion to enhance understanding. I therefore sought to explore how they are used at the CPNH. A key part was using social practice to highlight participants' role in contributing to the postnatural through their buying practices and cultural desires which was subtle and careful to encourage participant research off-site. Chapter Six, then, argued how the CPNH as an institution was a medium to exhibit knowledge produced through artistic practice, and uses its museum space to experiment with modes of understanding about the postnatural by employing different exhibiting techniques to cultivate participant curiosity.

The thesis has therefore provided insight into why artist-led institutions have emerged as opportunities for engaging with science and technology, drawing on key artist-led groups and artists who've created their own institutions to contribute to discussions around different aspects of science and technology.

[332] These came under the headings 1) framing; 2) designing; 3) engaging; 4) curating; 5) enchanting.

7.3. Thesis contributions

7.3.1. Experimental geographies

In Chapter One, I situated the thesis among experimental geographies literature, and I now return to some of the key tensions I identified to highlight the thesis' contributions to understandings of experiments.

Grounding the thesis in experimental geographies opened up discussions around key epistemological changes relating to experiments, and the production of knowledge. I highlighted moves towards using experiments towards being open ended and 'producing without guarantees' (Paglen, 2009b: n.p.), as ways to *open up* conversations rather than seeking to provide answers to pre-formed research questions. Experiments, then, are increasingly an invitation to thought, which, as Braun (2015) identifies, represent a key way of forcing thought on key situations and issues for productive solutions and ways of thinking to emerge.

This thesis speaks to the two component parts of experimental geographies Kullman (2013) identifies: the *geographies of experiments* and *experimental geographies*. It contributes to the *geographies of experiments* by bringing together the two parts the *geographies of experiments* has to tended to focus on so far: artistic and cultural practices/engagements, and engagements with science and technology. It shows artistic practices which are using a form of cultural practice – institutions – to engage with science and technology. In doing so, it takes steps towards answering Powell and Vaseduvan (2007)'s ambitious call to attend to 'the full range of bodies, texts and practices that constitute spaces of experimentation' (2007: 1790).

With regards to *experimental geographies*, this thesis represents a way of integrating geographic and artistic skills into new ways of thinking and conceiving of art and Geography. Key geographical principles underpin both White's and Pell's practices, while I participated in a form of artistic practice as research to help better understand the ways of knowing being implemented by artists[333] in this thesis. The thesis uses

[333] This is not to say that by involving myself in a form of artistic practice as research that I can automatically understand how artists conceive of the world. Instead, it is to suggest that attempting to adopt a process the artists I'm engaging with use offers an insight into how their practice(s) relate to their ways of understanding.

artistic practice and projects as the method of enquiry and as a way of understanding the world. Yet, it does so using geographical concepts at its core, such as sociality, spatiality, and interpretations of key spaces of knowledge production such as institutions. The thesis therefore represents a way of moving 'beyond the existing horizons' (Hawkins, 2011b: 241) of both art and Geography, demonstrating new forms of using and engaging with each.

Following the changes in experiments outlined in the experimental turn, I explored how artists' have used their practices to experiment with different forms of institution as a way to engage with science and technology. This thesis, therefore, pulled together this range of experimental artists working in different ways with experimental institutions in a way not done before. Doing so highlights the borrowing and sharing of ideas and influences between groups, enables ways to track changes in their practice(s), and engages with different ways publics are positioned in relation to art and institutions. In this way, this thesis has made three main contributions to the field of experimental geographies.

This thesis firstly shows the different forms of experiments being engaged with. These are not experiments happening exclusively with materials as the positivist science past of experiments might have favoured. Nor are experiments happening exclusively with individuals. As Chapter Four showed, practitioners can experiment in a myriad of ways. Each of the five artist-led groups I discussed in Chapter Four had a different way of experimenting with institutions, while White and Pell had two other ways too. Each of these seven different experiments used different combinations of materials and individuals to experiment with institutions, and sought to explicate the relationship *between* the materials and individuals of institutions being experimented with rather than a singular relationship. These practitioners in Chapter Four, then, showed how experiments can use a variety of engagements to open up discussion around critical topics.

Accordingly, a second contribution is to show the spaces of experimentation to be expanding, implicating individuals through social practice. In Chapter Five, I used White's work to demonstrate this, analysing the different relationships with site he draws on in different projects to experiment in. Experiments happen anywhere, and

on different scales. White's work shows these spaces of experiments as more diverse, but he also highlights these spaces as influencing what happens in the experiment. *Where* an experiment happens affects what happens in it, representing a considerable change from previous aims of experiments as assuming placelessness, and integrating social practice into an increasingly complex and nuanced understanding of experiments.

My third contribution to experimental geographies considers experiments' sociality. Who is allowed to perform experiments? Who is allowed to be experimented on? Both of these were shown, in Chapter Six, to be diverse, especially when powerful institutions, hobbyists, and consumers become involved. The postnatural example showed just how many people have experimented with organisms over thousands of years, and that while ethical restrictions in key scientific and research institutions may prohibit particular experiments on particular organisms, it also encourages others involved in research projects. Chapter Six also showed a different aspect of experiments' sociality, which relates to social practice. In social practice, participants are being experimented on to decide the artwork's meaning. Yet participants did not *devise* the experiment. Instead, they are being encouraged to engage with while it is running. They decide what the experiment is doing, where it is happening, and when it finishes. Control of the experiment therefore shifts from the experimenter to the experimentee. This highlights the complex relationship sociality has with experiments, and its change increasingly towards acknowledging and inviting active contribution from experimentee.

7.3.2. Institutions and knowledge

What I have shown in this thesis is how several artist-led groups have engaged with different institutions.

This thesis has shown artists' interest in engaging with science and technology given its political, economic, and social importance. Recently, these engagements have used parallel institutions, moves towards which came from developments in both the art world and science and technology. As I showed in Chapter Four, these parallel

institutions represent a way of engaging with individuals about science and technology which are not restricted to the scientific 'expert' shackled by their scientific institution (see Callon, 1999), yet still provide an element of institutional authority.

The parallel institutions discussed in this thesis showed how experimental artworks can produce new forms of knowledge by forcing thought on key issues, such as in science and technology. I showed this in three ways. Firstly, through using artist-led groups who experiment with institutions. Secondly, by using White's artistic experiments at the OOE using sites and social practice to influence perception, and thirdly by using Pell's work at the CPNH using different forms of engagement and aesthetics to experiment with public discussion of science and technology.

Central to this thesis' argument, the practice of the artist-led groups mentioned in this thesis, and to Neal White and Richard Pell, is the notion of using artistic practice as research. Performing their artistic practice leads to new forms of research, particularly in the case of MJT, CLUI, the OOE, and the CPNH, while each of these artist-led institutions uses their artistic practices to produce research which is then displayed in their artworks. This approach leads to new forms of knowledge when combined with social practice, by coalescing thoughts from participants in social artworks and using these artworks as research experienced in new ways. White and Pell introduce new ways of thinking about how knowledge can be produced. Their practices emphasise the *process* of producing artwork, and combine it with research as a part of an artistic practice as research approach.

This thesis does not suggest new forms of knowledge produced are necessarily more or less effective, should or should not replace, or carry more or less authority than existing methods of knowledge production. Rather, it is an invitation to *expand* the conversations around new knowledge forms, to further consider what opportunities these new forms of knowledge might produce, and their implications for Geography. This thesis does not pretend to pioneer any of the concepts used in it, but does argue its originality by *applying* notions of artistic practice, experiments, and institutions to Geography to ask critical questions around experiments and knowledge production. Chiefly, it opens considerations around institutional critique,

the distribution of expertise, the site of experiments, the social imaginary, and how (parallel) institutions can represent opportunities for furthering public understanding around science and technology. This thesis also asks how the example of engaging with contemporary science and technology issues might instead be applicable to engaging with contemporary issues in Geography, offering potential experimental ways for forcing thought on key geographical issues such as global exchange networks in a neoliberal world, or climate change for example.

I have shown these above considerations to be recently changing. Art is expanding the distribution of the sensible (Rancière, 2004; in Sayers, 2005) to expand the distribution of expertise and authority,[334] the sites of experimentation and knowledge production, and the media through which experiments happen and knowledge is produced. These changes are reflected in the 'experimental turn' (Braun, 2015; Powell and Vaseduvan, 2007), which Chapter One engaged with.

The thesis also has implications for understandings of institutions. These are summed up in three key ways. First, this thesis explored the fluidity of institutions, joining Latour and Yaneva (2008) in rejecting an understanding of institutions as seemingly fixed entities. As I showed in Chapter Four, institutions come about from connections between people, ideas, and expertise, which are complex, sprawling, and not universal as they manifest in people who each take a different understanding and influence of them. White was influenced by different artist-led groups and artists than Pell, even though they both engaged with Critical Art Ensemble (CAE) and the Center for Land Use Interpretation (CLUI), for example. Institutions also change over time, responding to different challenges at different times, such as the Artist Placement Group's decision to re-establish as Organisation and Imagination, and CAE's commitment to take on more controversial projects in the face of the US Department of Defence's attempted censorship of their work. Over time, ideas and expertise pass down through influence or conceptual lineage, and embed themselves in established ways of acting or practicing, in White's and Pell's cases.

[334] By expanding the 'distribution of expertise and authority', I refer to the emerging artist-led institutions to show how authority once reserved for established, populous institutions is increasingly encompassing new artist-led institutions which use artistic practice as research. Their research carries merit and is valuable in its own right, increasingly commanding authority with it (White, 2014).

Second, in this thesis I showed how artist-led institutions also have a spatial presence as manifest in particular sites and spaces. In Chapter Five, I used White's practice to show how every institution has a physicality to it, which is related to the expected 'norms' and behaviours associated with it. For example, *The Void* showed how conducting experiments involving ingestion were associated with scientific spaces like the laboratory. However, White's practice also showed how associated behaviours are influenced by social perception, which then affects behaviours at key sites. Challenging the social perceptions of scientists as being the only 'experts' capable of administering methylene blue affected how comfortable individuals felt in ingesting the blue pill themselves in a non-scientific space. Given that some ingested the pill and others did not, this opened a fertile space for discussion into either action as part of a project linking the spatial with the social.

This relationship with individuals brings me on to the third contribution to institutions, involving sociality. Throughout this thesis, I have shown institutions to be socially comprised. People decide the power of institutions through their choices. I highlighted this most clearly in Chapter Six, when I used Pell's CPNH to show that individuals can give enough power to institutions that entire genetic trajectories of species can be heritably and irreversibly altered. These changes came about through cultural desires, and with enough people wanting specific changes to species they altered institutions to make the necessary changes. This sociality was also part of Pell's plea by using social practice to encourage participants to conduct their own research and reflect on their own personal choices. A central message from the CPNH was that even the most powerful institutions can be overthrown if enough people abandon them. The CPNH also offered an insightful way to do this, using a museum with key aesthetic choices to encourage an open reflection and discussion.

Building on previous literature about institutions covered in Chapter Two, these contributions have helped further understanding into how different facets of institutions connect together, rather than existing in isolation from one another. I have shown institutions to be fluid, *and* spatial, *and* social. The three also link together and affect each other accordingly. Bringing together these diverse and varied engagements, I showed a range of creative approaches and conceptual tools

for critically understanding the social nature and implications of institutions, contributing new creative ways of engaging with institutions as part of producing novel forms of knowledge. This thesis, then, engages with the individuality and specificity of engagements between particular artist-led groups and particular institutions, highlighting their individual contributions towards wider conceptions of artists and institutions.

7.4. Experimental art:[335] challenges, possibilities and limits

7.4.1. Challenges

Researching (with) experimental art(ists) as a geographer was a fascinating experience, although it was riddled with challenges. The institutional focus of this thesis meant I undoubtedly diverted attention from other areas, such as the conceptual and methodological contributions of previous engagements between artists and geographers. For instance, I participated in the creative act of making and contributing to White's and Pell's practices, as well as drawing on their conceptual genealogies to further contextualise the lineage of their ideas and practices alongside more traditional ethnographic methods. This multi-faceted approach, however thorough it was intended to be, meant I often came in to contact with more and more artistic or creative practitioners on fieldwork, taking me further away from my disciplinary anchoring in Geography.

As I delved deeper, these contributions often, though not always, were through artistic practice, which was being used as a way of knowing.[336] The corporeal act of producing artworks does not just produce new ways of knowing (Hawkins, 2015; Williams, 2016) but also expresses embodied knowledges (Miller, 2017). For many of my network's groups and individuals, then, their artistic practice was how they made sense of the world. This was therefore what I chose to 'follow' (see Marcus,

[335] By 'experimental art', I don't mean to talk about a particular kind of art that is experimental. All art is experimental to an extent. Rather, I mean to designate a form of art specifically engaging with experiments.

[336] This relationship between different forms of artistic practice and ways of knowing was also documented in the geographical literature, such as Scalway's (2006) piece on drawing as knowing. For Miller (2017), artistic practice also drew on other knowledges embodied within the creative practitioner, which could be expressed in the artwork.

1995), subsequently neglecting other aspects of these artistic practitioners which the five previous main engagements between artists and geographers might have examined more closely.

I had also conducted fieldwork with these artist-led groups and artists with some understanding of their work; possibly more than the 'average' visitor seeing it at face value, but less than the artists themselves and their behind-the-scenes construction and conceptualisation. Chatting to the artists also meant I saw the projects much *closer* to their views, making it harder still to try and consider a perspective not informed by their opinions.[337] Consequently, reflecting on the spaces and exhibits in my field diary was difficult to place. This was further complicated by my realisation that I was shaping not just my project through empirical decisions, but also other projects such as White's *Centre of Centres* project given my role in producing that too.[338] Was I still just a researcher or a contributor? Using any form of ethnography like I did unavoidably entailed placing myself in the artistic process, while being physically based in certain spaces altered engagements with the space beyond just my presence. This acknowledgement made differentiating between reflecting things from the artist's perspective and my geographical perspective difficult.

There were also challenges relating specifically to White's and Pell's practices. Their projects in this thesis represented only a small sample of their practices, which are also liable to change through time as their interests and practices developed. Furthermore, I experienced the majority of White's projects – often focused on the experiential – retrospectively because they happened before the project's commencement, neglecting the experience. For Pell, there was an unavoidable temporal snapshot emblematic of fieldwork; displays change, exhibits are added and removed, and further decisions are made affecting these in the meantime.

[337] The artists' opinions were not always expressed explicitly in their projects, but often emerged in formal or informal discussions or interviews I had with them either before or during my stays.

[338] A similar argument can be made with regards to Pell at the CPNH too. Part of my CPNH duties when working there were contributing to CPNH work on the postnatural. These included doing tasks such as writing the Wikipedia entry for 'postnaturalism', researching CAFOs on Google Earth, and contributing to PNOOTM. Further, my presence there during CPNH opening hours unavoidably altered the atmosphere for visitors expecting to see Pell there, or for those who asked questions I couldn't answer. I was, therefore, actively contributing to Pell's CPNH, shaping that too.

7.4.2. Possibilities

As identified in this thesis, working at the interface of experiments, art, Geography and institutions helped highlight some enormous possibilities of experimental art for deepening and developing understanding and creating new ways of engaging with institutions. The methodological multi-faceted approach I discussed in 7.4.1., for instance, represented a new way of collaborating with artists which relied on a combination of contextualising, understanding, creating, and studying to investigate their contribution to experimenting with institutions as part of a wider engagement with science and technology. What this then produced was an insight into an *area* of art where these artist-led groups and artists were operating, rather than focusing on a singular artist's practice or artwork. In studying seven[339] main contributors to this network I was able to situate these groups among the wider network and appreciate the contribution of each, as well as the novelty of their own, unique practices. This helped show some of the possibilities this form of art – and way of approaching it – presents for producing new forms of knowledge.

In this thesis, I've shown that drawing on experimental geographies as a framework can be helpful in pulling together some of the opportunities that working with artists brings, especially artists working on science and technology. Using the language of 'experiments' helped tap into the scientific discourse common when discussing science and technology, yet their targeting towards public audiences also allowed for non-scientists and non-technicians to get involved. Experiments therefore help provide a purpose for an engagement between different groups of people/disciplines/schools of thought who might not otherwise engage with one another.

But given the broad remit of experimental geographies, engagements do not have to be limited to involving artists somewhere in the process. A benefit of experimental geographies is that it offers a way to bring together different modes of thinking around new challenges, and the demands these new challenges are placing on institutions. Some of the experiments in this thesis redistributed notions of expertise; others challenged the spatial and conceptual boundaries of knowledge production.

[339] I say seven because of the five artist-led groups I identified, plus White's OOE and Pell's CPNH.

These are just two of the ways conducting experiments invited individuals to contribute to science and technology in ways which help their understanding of science and technology, rather than relying on the translation of knowledge from hybrid forums (Callon et al., 2009) or 'experts' (Callon, 1999) and the assumed percolation and subsequent action of this knowledge.

The kinds of open conversations presented by new forms of experiments do not have to be limited to artists; indeed, using these artist-led groups' and artists' works which engages with the public shows that every individual has the potential to be involved if they want to be. While artists were involved in producing these conversations, as the experiments in this thesis showed, there are no limits to who can be involved. Once publics start to embrace these opportunities, they too will have the tools to conduct their own experiments.[340]

7.4.3. Limits

While experimental geographies offer possibilities, their potential also has limits. Using artists as part of the discourse around experimental geographies to an extent mutes the possibilities offered by experimental geographies, as artists already vibrantly contribute to other areas of Geography. Experimental geographies is potentially a much wider conceptual area which prides itself on offering completely new ways of approaching situations which exists beyond the existing horizons and limits of current processes of knowledge production. Part of why I based the thesis around engagements with artists was to highlight one way that one group of people have sought to engage with experiments, and have attempted to get other individuals involved. Experimental geographies absolutely does not need to be confined to engagements with artists.

Additionally, as engagements with Science and Technology Studies (STS) highlights in relation to public understanding of science (see Lane, 2011), giving individuals the

[340] There are ethical concerns about how these experiments might be run under different or a lack of institutional control which would need to be considered as part of the experimental process, alongside material and conceptual concerns too. Further research would be needed to duly consider these.

conceptual tools to use themselves assumes a trouble-free dissemination of knowledge whereby each person knows and understands the process perfectly, agrees with it, and is happy to engage in experiments. This is not always the case.[341]

Besides, it is not as straight forward as that in any case. Ethically, any new power given to such a large number of new people from all different backgrounds would require some form of regulation and control to ensure responsibility in experiments relating to individuals' welfare. While this could involve elements of trust, such as those who consumed the blue pill in White's *The Void* project and in doing so clearly demonstrated a trust in him, it raises concerns for how power dynamics between those performing the experiment and those participating in the experiment might play out.

There is also the legitimate concern that using a discourse around 'experiments' could prove problematic, given the historical use of experiments which by contemporary standards are ethically dubious and troublesome. Experiments such as those performed by Galen in the medieval period (Ivy, 1948), surgeons and vivisectionists during the Victorian era (Turner, 1980), the Nazis leading up to and during World War II (WWII) (Grodin, 1992), and the US leading up to WWII (Lederer, 1995) all involved elements of human suffering and arguably torture, while present-day experiments on animals continue similar debates. Experiments have a brutal history, and arguably building on this discourse – even if it by means of re-working what it means to experiment – does not remove the social, cultural, historical and ethical difficulties associated with past experiments.

7.5. Future research avenues

This thesis has provided a foundational exploration into artist-led groups' engagement with institutions which could underpin future research into similar areas. One avenue of future research could be an extension of this thesis, following similar

[341] Examples of this are Callon (1999) who devises three models to enhance public understanding of science, and the outcome of the 'GM Nation' debate in 2003 where, despite having all the scientific information available, the UK public opted against the inclusion of genetically modified ingredients in food despite it being favourably viewed in the media.

themes in further depth. Marcus (2016) identifies value in extending and producing return fieldwork in collaborations with artistic practitioners. For Marcus, the collaboration involves "making opportunity in the design of the installation and finding it in the serendipity of return fieldwork" (Marcus, 2016: 15). When designing a collaborative project, the social scientist's interest in the project's material creates an opportunity for future fieldwork while the artist creates more ideas and interpretations to reflect on and modify the installation for further works. The social scientist, then, not only reports on this collaboration in relation to their research questions, but can use the research as grounding for devising *future* research questions for a *future* project. The social scientist could then decide whether to conduct return fieldwork with the same people and sites at a later date, or to use insight and interpretation from the artistic practitioner to augment their previous study. The material in this thesis could therefore also be used as a tool in developing future research projects *from* this project.

This brings me onto a second possible future avenue for this thesis, which might be to devise a project using a different set of (artistic)[342] practitioners with different practices and/or nationalities to those covered in this thesis. In this thesis, I charted an overview of predominantly male artist-led groups and artists from the UK and US interested in engaging with science and technology. A future study might like to consider more diverse groups and individuals from different countries interested with interests different to science and technology. For example, when scoping my network I conversed with artists as far afield as Argentina[343] and was made aware of countless others,[344] while there were also others I discovered when researching for the *CoC*. These others ended up outside my network because, although they were related, their groups had foci which strayed too far from the critiques of science and technology this project dealt with. Many of these might serve as starting points for future research with a different research focus, with different access secured, and perhaps a longer time to conduct empirical research. Insights gained from these

[342] I put this in brackets because, as Last (2012b) outlines, experimental geographies advocates possible engagements for any practitioner, thereby not limiting engagements to artists.

[343] The Argentine artist group I spoke to was Ala Plástica. Given their limited English communication skills and my non-existent Spanish skills, I exchanged emails with one member of their group, Alejandro Meitin, over email using translation services to mediate our communication.

[344] Some of these are covered in the appendices of White's (2014) Ph.D. thesis.

could also then lead to a different country-specific context framing practices in a way previously under-explored or overlooked. Groups and artists from different countries with different interests could therefore contribute valuable and insightful research for a future project more focused on, for example, artistic practices in different countries, or political climate.

A third future avenue could involve techniques used by artist-led groups which could instead be used to engage with contemporary issues in Geography rather than science and technology. This thesis explored different methods of experimenting, such as experimenting with institutions, sites, or public discussion. It also engages with different aspects of experiments, such as experiments' personnel, sites, and media. This range of engagements with experiments could be used for different purposes, such as inviting artists into experimental engagements focusing on contemporary geographical issues, allowing, as Stengers (2000) argues, "the citizens of whom scientific[345] experts speak [to be] effectively present [and] participate in the invention of knowledge" (2000: 160). As Whatmore and Landström (2011) have shown in their experimental forum approach to the UK flooding threat, presenting a *geographical* situation to force thought around uses individuals' in collectives to disrupt established 'orders of thought' (Braun, 2015) and create opportunities for new forms of knowledge. In this way, using different modes or forms of experimenting with other materials, sites, or personnel could provide new insights and contexts to contribute new forms of knowledge with.

7.6. Future challenges for artist-led institutions

In this thesis, I have used an insight into the practices and processes of artist-led groups to map part of a world unfolding since the 1960s which existed against its respective UK and US wider political, economic, social, and cultural contexts. This marked a time period where, up until the 1990s, both the arts and the sciences were relatively well-funded nationally, albeit not consistently. Since the 1990s and the 'culture wars' in the US, funding in both the UK and US has steadily declined,

[345] Or, potentially, geographical experts in the context I'm using.

especially in the arts. This is a picture looking set to continue as governments in both the UK and US plan out their projected budgets going into the 2020s.

What this thesis has shown, is how intellectual, creative, and conceptual contributions in both the arts and the sciences can flourish when provided with the necessary platform. The artist-led groups I have discussed only succeeded because they had support of some kind or another from funding bodies under different guises. Once public funding is reduced, it threatens the existence of groups – both in the arts and the sciences – who have the potential to make substantial societal changes for the better, and forces them to rely on private, sporadic, and unguaranteed funding.

Two solutions to this problem have already been attempted in the 1990s. One is by institutions like the Arts Catalyst using their extensive networks and contacts to aid in funding upcoming projects. The second is private funding. All three US-based artist-led groups mentioned in Chapter Four received some form of private funding, while both the OOE and CPNH have also had to rely on different forms of it to differing extents to survive.

Meanwhile, alongside this funding squeeze are increased metrics and forms of assessing the 'value' and 'impact' of artistic (Wright, 2014) and scientific research, projects, and works which are converted into numbers as a measurable output to assess economic viability and justification. As I'm sure the majority of artists and scientists would agree, the value of their work is never solely monetary. Instead, for art its contribution to society is art, as the APG and OOE assert. For science, it can be the novelty in discovering, in Rheinbergian terms, the epistemic thing; the *application* of the study into other areas of knowledge. These are not things that are readily quantifiable, and less necessarily economically justifiable. Macdonald-Munro (2004) highlights what this means in practical terms, with his example of when former members of APG attempted to win funding for further investigation into Latham's Flat Time theory in 2001:

> 'An attempt was made in 2001 to obtain funding for just such an academic research project to test the proposals of 'Flat Time' by practical experiment and extensive computer modelling, working with the Quantum Gravity Department of Imperial College London. However the funding application

> failed to focus sufficiently on the economic profits that might arise from the potential applications for 'Flat Time' in the commercial world. Luckily for the rest of us, neither the Special nor General theories of Relativity, nor the theoretical process that lead to Quantum Mechanics were ever required to satisfy such an unscientific agenda. It is clear that atomic power and quantum computing which directly derived from such theoretical advances proved of massive commercial significance. However, profit potential alone is not an acceptable or feasible qualifier for the relevance of radical scientific thought' (MacDonald-Munro, 2004: n.p.).

Since 2001, the situation has radically deteriorated, making MacDonald-Munro's point even more salient.

This has practical and conceptual implications for the experimental artist-led institutions I mention in this thesis. For both the OOE and CPNH, their current funding is limited and what happens after this is a concern. How might they seek to continue? Will they be able to continue in their current guises or might they need to shift focus more towards 'conventional' institutions to secure future funding? Upon asking White an interview question about this situation, he outlined three options for the OOE's future:

> "Things are tough at the moment […] There's two kind of strategies – well, there's three in fact. One is going for complete autonomy and setting it up more seriously as a thing. [Another] is to fulfil the strategic aims of the department catastrophe […]. If we fulfil that strategy then that is the ultimate collapse of Office of Experiments in a project, so we'll devise a project in which Office of Experiments is taken apart and no longer exists, or exists only as a ruin. […] And then the other strategy is to align it more closely to somebody like Arts Catalyst so it […] goes down a more research function" (White, 1st interview, 19/12/2014).

So the three options for the OOE are 1) become a more 'conventional' institution; 2) destroy the OOE; or 3) move towards a research function. Alarmingly for White, one genuine future option is to destroy the very institution he has been running for 13 years. Any of these three options however would conceptually and logistically alter

its comprisal, making it a different institution to what it is now and taking on the form of something more consistently capable of sustaining funding.

For the CPNH, the picture is slightly different but still logistically and conceptually difficult. Fortunately, they are not overly reliant on particular funding sources to the extent that they are "beholden to anyone" (Pell, 2nd interview, 06/05/2015). Pell and Allen own the CPNH building which removes a major expense, though there are still costs which need meeting, often out of their own pocket as Allen stated in Chapter Six. Pell is clear about his future goals:

> "I would definitely welcome being able to scale up. […] It's clearly something that I want but I don't want that at the expense of our kind of autonomy and our independence. We've grown rather slowly and that's been on purpose very much. We're not dependent on any one source of funding […]. I'd love to have a new wing but if it's a wing that is funded by a single entity then that carries with it certain strings and limitations. Our strength is the fact that we really have no strings. […] Right now [the CPNH] exists at a scale that a very, very small group of people can manage. And once you get above a certain size then you're really operating a kind of bureaucracy, and right now we don't have that. […] It gives us the independence and autonomy to do and say whatever we want, which is super essential" (Pell, 2nd interview, 06/05/2015).

Clearly for Pell, there is no option of ceasing for the CPNH. It *must* continue. Any change to the CPNH and the conceptual and logistical implications of this must be carefully and thoroughly thought through. He is aware that expanding the CPNH would likely require funding which could compromise the autonomy he has built so far. And Pell is clear that any changes which would compromise key lynchpins of the CPNH, such as its autonomy, are unwelcome. Accordingly, these funding situations in the UK and US present considerable challenges for both White and Pell.

In this way, this thesis has provided a glimpse into the relationship between science, art, and politics, a relationship which is vitally important to not just creativity and intellectuality, but to the development and furthered understanding of humankind as a species. Political decisions made now have the power to not just undo recent

developments or affect social and cultural norms for generations, though these are also likely outcomes. These decisions also have the power to alter our species' genetic trajectory – just like with postnatural organisms – through funding, subsidies, and incentives. In no uncertain terms, the coming decades represent substantial challenges if the kind of developments as seen throughout the 20th Century are likely to be built on further at a time when global challenges present arguably our species' toughest test. This should not be an opportunity for resting on laurels and becoming comfortable with established neoliberal practices and protocols, but should instead represent a vibrant and exciting time to produce ever-greater social and cultural developments in the face of increasing global adversity. Decisions made over the coming months and years promise to have profound effects moving forward, but whether these are positive or negative depends on each individual's actions.

7.7. Final remarks

I want to end by reflecting on the thesis as a whole experience. I feel enormously privileged to have been able to research such an intellectually stimulating, challenging, and exciting project. Being a part of such vibrant and exciting projects as White's and Pell's was fascinating, enjoyable, and in some ways foundational. Their enthusiasm and fascination with their own research areas was infectious and influential in altering my own personal views. Once questions were asked through White's experimental practice of science and technology, they laid the foundation for inquisition of other institutions. Likewise with Pell, once trained to see the postnatural, I noticed it everywhere. My wish throughout this thesis has been to convey the exhilaration I experienced when undertaking the research, while grounding them with key concepts to highlight just how useful and integral, I believe, White's and Pell's practices are in engaging with, understanding, and working with science and technology as the 21st Century unfolds. If I have not managed to convey this, I would instead like to end with a call for new forms of knowledge to be acted on, experienced, and used rather than just theorised about. The experiential is after all, as both White and Pell have shown, where new forms of knowledge can inspire curiosity, and ultimately, positive social and cultural change.

8.0. Appendices

8.1. Appendix A – Copy of ethics pamphlet issued to Center for PostNatural History visitors

PhD Research

UNIVERSITY OF EXETER

I am in Pittsburgh today as part of my PhD research examining artists' exhibitions, experiments and archives.

I am interested in the sites and spaces created through the ways artists work. As part of my research I am exploring the different ways in which artists are involved in practices and curating, networking and collaborating.

I am also interested in the ways in which people might experience and make sense of these new kinds of exhibitions, experiments and archives.

My PhD considers the following questions and issues:

- The role of art in bringing our attention to issues and exhibits that are not collected or shown elsewhere
- The work of artists in creating spaces for exhibiting and archiving these specimens
- The way these artist practices offer an alternative way of viewing and experiencing sites and specimens

Further detail on my webpage:

https://eprofile.exeter.ac.uk/dominicwalker/

Personal details

I am Dominic Walker, a second year PhD student in the Geography Department at the University of Exeter in the UK.

I am interested in the overlaps between science, technology and art. I am particularly interested in the spaces artists create for us to encounter and experience new kinds of science and nature. I am also interested in our changing relationships with the environment.

Contact details

I can be contacted in the following ways:

Email - dw371@exeter.ac.uk

Twitter - @domwalks

LinkedIn – uk.linkedin.com/pub/dominic-walker/38/471/869

Postal service - Room C360 Amory Building, University of Exeter, Rennes Drive, Exeter, Devon, EX4 4RJ, United Kingdom.

'That Was Then. This Is Now.' What's your view?

CENTER FOR POSTNATURAL HISTORY

"That was then. This is now."

Do you agree we are now living in a PostNatural world?

Are our existing educational outlets and institutions now outdated?

What roles does an artist play in helping us make sense of this?

I am very interested in your views on the following kinds of questions:

- What motivated you to come to the CPNH?
- Have you been to any exhibitions like this before?
- What did you enjoy about the visit today? Did anything trouble you?
- What experiences or questions will you take away with you?

There are no right or wrong answers to these questions. I welcome all input and viewpoints and I'd be delighted to hear your views so do please get in touch.

Project details

I am in Pittsburgh for six weeks looking at the work of Richard Pell, artist and Professor of Electronic Media Art at Carnegie Mellon University.

I'm interested in his Center for PostNatural History (CPNH), a space dedicated to the advancement of knowledge involved where culture, nature and biotechnology overlap.

The CPNH is a leading example of art practice existing where experimental practices, public outreach and institutions meet.

All the specimens here have been genetically altered in some way, and so ask fascinating questions about our changing relationship with nature and the environment.

This research forms part of my research on the spaces that art is creating for the consideration of these changing relations, and will involve interviews, taking part in the activities of the CPNH and discussion groups with visitors.

The research will explore the intertwining of the planet's 'natural' history with our own cultural history through the work of the CPNH.

Participant promise

I promise to all participants that:

- You will be fully informed about the project and the nature of the research
- You may freely withdraw from the research at any time with no penalty
- Your personal information shall be stored and used in accordance with the UK Data Protection Act (1998)
- Your permission will be requested before any audio or digital recordings are made
- Your opinions may be used in the write up of the research, but you will not be named in any work (e.g. academic publications and my PhD that result from this research)
- You may request a copy of any information you provide
- This research has been approved by the University of Exeter's ethics committee

UNIVERSITY OF EXETER

Participant Form

Name:

Email:

Place of Work (optional):

I can confirm:

- I have read and understood the contents of this leaflet
- I am happy to take part in this research
- I understand that I can request further information about the project and my participation at any point

Please tear off this form and return to Dominic Walker before the end of the session.

Signed:

Date:

9.0. Bibliography

Adams, B. (2008) *How artist Steve Kurtz became the target of weapons of mass distortion* [online]. [Accessed 7 March 2017]. Available from: http://adams-studio.com/how-artist-steve-kurtz-became-the-target-of-weapons-of-mass-distortion/.

Adams-Hutcheson, G. and Longhurst, R. (2016) 'At least in person there would have been a cup of tea': interviewing via Skype. *Area*, **49**(2), pp. 148-155.

Adey, P. (2010) *Mobility*. London: Routledge.

Agamben, G. (2005) *State of exception*. Chicago, IL: University of Chicago Press.

Alberro, A. and Stimson, B. (eds.) (1999) *Conceptual art: a critical anthology*. Cambridge, MA and London: MIT Press.

Alberro, A. and Stimson, B. (eds.) (2009) *Institutional critique: an anthology of artist's writings*. Cambridge, MA and London: MIT Press.

Alberti, S. J. M. M. (2009) *Nature and culture: objects, disciplines and the Manchester Museum*. Manchester: Manchester University Press.

Allen, J. (2016) *Topologies of power: beyond territory and networks*. Abingdon: Routledge.

American Association of Geographers [AAG] (2015) *Call for papers: GeoHumanities* [online]. [Accessed 6 June 2016]. Available from: http://news.aag.org/2015/04/call-for-papers-geohumanities/.

Anderson, B. and Harrison, P. (2011) *Taking place: non-representational theories and geography*. Farnham: Ashgate.

Anderson, B. and Wylie, J. (2009) On materiality. *Environment and Planning A*, **41**(2), pp. 318–335.

Appadurai, A. (ed.) (1986) *The social life of things: commodities in cultural perspective*. Cambridge: Cambridge University Press.

Arrigo, J.M. (2000) The ethics of weapons research – a framework for moral discourse between insiders and outsiders. *Journal of Power and Ethics: An Interdisciplinary Review*, **1**(4), pp. 302-327.

Artist Placement Group [APG] (2017) *Artist Placement Group – Timeline* [online]. [Accessed 19/04/2017]. Available at: http://en.contextishalfthework.net/about-apg/artist-placement-group/.

Arts Catalyst (2005) *Research is not terrorism: Steve Kurtz* [online]. [Accessed 3 October 2016]. Available from: http://www.artscatalyst.org/research-not-terrorism-steve-kurtz.

Arts Catalyst (2014) *A brief history of the Arts Catalyst* [online]. [Accessed 16 February 2016]. Available from: http://www.artscatalyst.org/sites/default/files/project_attachments/20years-booklet.pdf.

Arts Catalyst (2016) *About Arts Catalyst* [online]. [Accessed 16 February 2016]. Available from: http://www.artscatalyst.org/content/about-arts-catalyst.

Arts Catalyst (2017) *Dark Places* [online]. [Accessed 4 April 2017]. Available from: http://www.artscatalyst.org/dark-places.

Ashmore, M. (1989) *The reflexive thesis: Wrighting sociology of scientific knowledge*. Chicago, IL: University of Chicago Press.

Ashmore, P., Craggs, R. and Neate, H. (2012) Working-with: talking and sorting in personal archives. *Journal of Historical Geography*, **38**(1), pp. 81–89.

Ashton, S. (2016) *The individual and the organisation: Artist Placement Group 1966–79* [online]. [Accessed 29 September 2016]. Available from: https://artreview.com/reviews/jan_feb_2013_review_artist_placement_group_at_raven_row/.

Ashutosh, A. (2010) *Crossing streets, crossing nations: South Asian transnational identities in Toronto*. Ph.D. thesis, Syracuse University.

Austin, J. L. (1975) *How to do things with words*. Oxford: Oxford University Press. Originally published in 1962.

Bailey, A. J. (2009) Population geography: lifecourse matters. *Progress in Human Geography*, **33**(3), pp. 407-418.

Bailey, C., White, C. and Pain, R. (1999) Evaluating qualitative research, dealing with the tensions between 'science' and 'creativity'. *Area*, **31**(2), pp. 169–183.

Baker, S. (2000) *The postmodern animal: essays in art and culture*. London: Reaktion Books.

Baker, S. (2009) 'Tangible and real and vivid and meaningful': Lucy Kimbell's not-knowing about rats. In: Rossini, M. and Tyler, T. (eds.) *Animal encounters*. Leiden: BRILL, pp. 197–218.

Bal, M. (1996) *Double exposures*. London: Routledge.

Banfield, J. (2015) Knowing between: generating boundary understanding through discordant situations in geographic-artistic research. *cultural geographies*, **23**(3), pp. 459–473.

Banfield, J. (2016) Amateur, professional and proto-practices: a contribution to 'the proficiency debate'. *Area*, **49**(2), pp. 130-136.

Barad, K. (2007) *Meeting the universe halfway: quantum physics and the entanglement of matter and meaning*. Durham, NC: Duke University Press.

Barnes, T. (2001) Lives lived and lives told: biographies of geography's quantitative revolution. *Environment and Planning D*, **19**(4), pp. 409–429.

Barrett, K. (2014) *No title given*. Museums Association Conference 2014, 9–10 October, Cardiff.

Barry, A. (2013) *Material politics: disputes along the pipeline.* Chichester: John Wiley & Sons Ltd.

Bartolini, N., Raghuram, P. and Revill, G. (2016) Provocations of the present: what culture for what geography?. *Social and Cultural Geography*, **17**(6), pp. 745–752.

Beisel, U. and Boëte, C. (2013) The flying public health tool: genetically modified mosquitoes and malaria control. *Science as Culture*, **22**(1), pp. 38–60.

Bélanger, G. (2008) *Points of interest at the Center for Land Use Interpretation: a tour in the margins of social ecology*. Ph.D. thesis, Concordia University.

Benjamin, W. (1999) *The arcades project*. Cambridge, MA: Harvard University Press.

Bennett, J. (2001) *The enchantment of modern life: attachments, crossings and ethics*. Princeton, NJ: Princeton University Press.

Bennett, J. (2010) *Vibrant matter: a political ecology of things*. Durham, NC: Duke University Press.

Bennett, K. (2002a) Participant observation. In: Shurmer-Smith, P. (ed.) *Doing cultural geography*. London: Sage, pp. 139–150.

Bennett, K. (2002b) Interviews and focus groups. In Shurmer-Smith, P. (ed.) *Doing cultural geography*. London: Sage, pp. 151–162.

Bennett, T. (1995) *The birth of the museum: history, theory, politics*. London: Routledge.

Berger, J. (2008) *Ways of seeing*. London: Penguin. Originally published in 1972.

Berk, G. and Galvan, D. (2009) How people experience and change institutions: a field guide to creative syncretism. *Theory and Society*, **38**, pp. 543–580.

Billo, E. and Mountz, A. (2016) For institutional ethnography: geographical approaches to institutions and the everyday. *Progress in Human Geography*, **40**(2), pp. 199–220.

Bimmerle, G. (2008) *"Truth" Drugs in Interrogation* [online]. [Accessed 7 April 2017]. Available from: https://www.cia.gov/library/center-for-the-study-of-intelligence/kent-csi/vol5no2/html/v05i2a09p_0001.htm.

Bishop, C. (2012) *Artificial hells: participatory art and the politics of spectatorship*. London and New York: Verso Books.

Bliss, E. (2015) *Performative methodologies: geographies of emotion and affect in digital storytelling workshops*. Ph.D. Thesis, University of Waikato.

Boldrick, S. (2015) *Trash as trash as art: reflections on the preservation and destruction of waste in artistic practice* [online]. [Accessed 8 July 2016]. Available from: http://www.nanocrit.com/issues/7-2015/trash-trash-art.

Bondi, L. (2005a) Making connections and thinking through emotions: between geography and psychotherapy. *Transactions of the Institute of British Geographers*, **30**(4), pp. 433–448.

Bondi, L. (2005b) The place of emotions in research: from partitioning emotion and reason to the emotional dynamics of research relationships. In: Davidson, J., Bondi, L. and Smith, M. (eds.) *Emotional geographies*. Aldershot: Ashgate, pp. 231–246.

Borgdorff, H. (2010) Artistic research as boundary work. In: Caduff, C., Siedenthaler, F. and Wachtli, T. (eds.) *Art and artistic research: Zurich yearbook of the arts*. Zürich: Scheidegger & Spiess, pp. 72–79.

Borgdorff, H. (2012) Boundary work: an interview with Michael Schwab. In: Mareis, C., Dombois, F. and Schwab, M. Bauer, U.M. (eds.) *Intellectual birdhouse: artistic practice as research*. London: Koenig Books.

Born, G. and Barry, A. (2010) ART-SCIENCE: from public understanding to public experiment. *Journal of Cultural Economy*, **3**(1), pp. 103–119.

Bourdieu, P. (1984) *Distinction: a social critique of the judgement of taste*. Cambridge, MA: Harvard University Press.

Bourdieu, P. (1992): *In other words*. Cambridge: Polity Press.

Bourdieu, P. (1993) *The field of cultural production*. Oxford: Polity Press.

Bourriaud, N. (2002) *Relational aesthetics*. No location: Les presses du reel.

Brannen, P. (2017) This is how your world could end. *The Guardian* [online], 9 September. [Accessed 11 September 2017]. Available from: https://www.theguardian.com/environment/2017/sep/09/this-is-how-your-world-could-end-climate-change-global-warming.

Braun, B. (2015) From critique to experiment? Rethinking political ecology for the Anthropocene. In: Perreault, T., Bridge, G. and McCarthy, J. (eds.) *The Routledge handbook of political ecology*. Abingdon: Routledge, pp. 102–114.

Brauen, F. (1982) Athanasius Kircher (1602-1680). *Journal of the History of Ideas*, **43**(1), pp. 129–134.

British Broadcasting Corporation [BBC] (2014): *Porton Down at front line of UK's Ebola prevention efforts* [online]. [Accessed 15 April 2017]. Available from: http://www.bbc.co.uk/news/health-28781429.

Browne, K. (2003) Negotiations and fieldworkings: friendship and feminist research. *ACME: An International E-Journal for Critical Geographies*, **2**(2), pp. 132–146.

Buchli, V. and Lucas, G. (2001) *Archaeologies of the contemporary past*. London: Routledge.

Butler, J. (1999) Performativity's social magic. In: Shusterman, E. (ed.) *Bourdieu: a critical reader*. Oxford: Blackwell, pp. 113–138.

Butler, J. (2002) What is critique? An essay on Foucault's virtue. In: Ingram, D. (ed.) *The political: readings in continental philosophy*. London: Blackwell, pp. 212–228.

Butler, T. (2006) A walk of art: the potential of the sound walk as practice in cultural geography. *Social and Cultural Geography*, **7**(6), pp. 889–908.

Buttimer, A. (1976) Grasping the dynamism of lifeworld. *Annals of the Association of American Geographers*, **66**(2), pp. 277–292.

Butz, D. (2001) Autobiography, autoethnography, and intersubjectivity: analyzing communication in northern Pakistan. In: Moss, P. (ed.) *Placing autobiography in geography*. Syracuse, NY: Syracuse University Press, pp. 149–166.

Calkins, L. (2010) Detained and drugged: a brief overview of the use of pharmaceuticals for the interrogation of suspects, prisoners, patients, and POWs in the US. *Bioethics*, **24**(1), pp. 27-34.

Callon, M. (1986) Some elements of a sociology of translation: domestication of the scallops and the fishermen of Saint Brieuc Bay. In: Law, J. (ed.) *Power, action and belief: a new sociology of knowledge*. London: Routledge, pp. 196–233.

Callon, M. (1999) The role of laypeople in the production and dissemination of scientific knowledge. *Science Technology Society*, **4**(1), pp. 81–94.

Callon, M., Lascoumes, P. and Barthe, Y. (2009) *Acting in an uncertain world: an essay on technical democracy*. London: MIT Press.

Cameron, E. (2012) New geographies of story and storytelling. *Progress in Human Geography*, **36**(5), pp. 573–592.

Center for Land Use Interpretation [CLUI] (2016a) *About the Center* [online]. [Accessed 9 February 2016]. Available from: http://www.clui.org/section/about-center.

Center for Land Use Interpretation [CLUI] (2016b) *Historic information about the CLUI Wendover Residence Program* [online]. [Accessed 14 February 2016].

Available from: http://www.clui.org/section/historic-information-about-clui-wendover-residence-program.

Center for Land Use Interpretation [CLUI] (2016c): *About the database* [online]. [Accessed 5 October 2016]. Available from: http://clui.org/ludb/page/about-database.

Center for Land Use Interpretation [CLUI] (2017a) *Nellis Range Complex, Nevada* [online]. [Accessed 10 March 2017]. Available from: http://www.clui.org/ludb/site/nellis-range-complex.

Center for Land Use Interpretation [CLUI] (2017b) *Dugway Proving Ground* [online]. [Accessed 14 March 2017]. Available from: http://www.clui.org/project-site/9100/6612.

Center for PostNatural History [CPNH] (2016) *About* [online]. [Accessed 02 December 2016]. Available from: http://www.postnatural.org/About.

Chartier, R. (1994) *The Order of Books*. Cambridge: Polity Press.

Clark, C. T. and Moss, P. (1996) Researching with: ethical and epistemological implications of doing collaborative, change-oriented research with teachers and students. *Teachers College Record*, **97**(4), pp. 518–548.

Classen, C. and Howes, D. (2006) The museum as sensescape: western sensibilities and indigenous artifacts. In: Edwards, E., Gosden, C. and Phillips, R. (eds.) *Sensible objects: colonialism, museums and material culture*. Oxford: Berg Publishers, pp. 199–222.

Collard, R. (2014): Putting animals back together, taking commodities apart. *Annals of the Association of American Geographers*, **104**(1), pp. 151-165.

Cook, I. (2001) You want to be careful you don't end up like Ian. He's all over the place. In: Moss, P. (ed.) *Placing autobiography in geography*. Syracuse, NY: Syracuse University Press, pp. 99–120.

Cook, I. (2004) Follow the thing: papaya. *Antipode*, **36**(4), pp. 642–664.

Cook, I. et al. (2000) Social sculpture and connective aesthetics: Shelley Sacks's 'exchange values'. *Ecumene*, **7**(3), pp. 337–343.

Cook, I. et al. (2006) Geographies of food: following. *Progress in Human Geography*, **30**(5), pp. 655–666.

Cook, I. et al. (2014) 'Afters': 26 authors and a 'workshop imagination geared to writing'. cultural geographies, **21**(1), pp. 135–140.

Cook, I. and Crang, P. (1996) *Commodity systems, documentary film making and new geographies of food: Amos Gitai's Ananas*. Royal Geographical Society with the Institute of British Geographers Annual International Conference, January 1996, Glasgow.

Cook, I. and Harrison, M. (2007) Follow the thing: West Indian hot pepper sauce. *Space and Culture*, **10**(1), pp. 40–63.

Cook, I. and Tolia-Kelly, D. (2010) Material geographies. In: Hicks, D. and Beaudry, M. (eds.) *Oxford handbook of material culture studies*. Oxford: Oxford University Press, pp. 99–122.

Cook, I. and Woodyer, T. (2012) Lives of things. In: Sheppard, E., Barnes, T. and Peck, J. (eds.) *Wiley-Blackwell companion to economic geography*. Oxford: Wiley-Blackwell, pp. 226–241.

Cook, I., Evans, J., Griffiths, H., Morris, R. and Wrathmell, S. (2007) 'It's more than just what it is': defetishising commodities, expanding fields, mobilising change. *Geoforum*, **38**(6), pp. 1113–1126.

Coolidge, M. and Simons, S. (eds.) (2006) *Overlook: exploring the internal fringes of America with the Center for Land Use Interpretation*. New York, NY: Metropolis Books.

Corris, M. (1994) From black holes to boardrooms: John Latham, Barbara Steveni, and the order of undivided wholeness. *Art and Text*, **49**, pp. 66–72.

Crang, M. (2003a) Qualitative methods: touchy, feely, look-see? *Progress in Human Geography*, **27**(4), pp. 494–504.

Crang, M. (2003b) Telling materials. In: Pryke, M., Rose, G. and Whatmore, S. (eds.) *Using social theory*. London: Sage, pp. 128–145.

Crang, M. (2005a) Qualitative methods: there is nothing outside the text? *Progress in Human Geography*, **29**(2), pp. 225–233.

Crang, M. (2005b) Analysing qualitative materials. In: Flowerdew, R. and Martin, D. (eds.) *Methods in human geography: a guide for students doing a research project*. Harlow: Pearson Education Limited, pp. 218–232.

Crang, M. (2010) Cultural geography: after a fashion. *cultural geographies*, **17**(2), pp. 191–201.

Cresswell, T. (2013) Value, gleaning and the archive at Maxwell Street, Chicago. *Transactions of the Institute of British Geographers*, **37**(1), pp. 164–176.

Cresswell, T. (2014) Geographies of poetry/poetries of geography. *cultural geographies*. **21**(1), pp. 141–146.

Cresswell, T. and Martin, C. (2012) On turbulence: entanglements of disorder and order on a Devon Beach. *Journal of Economic and Social Geography*, **103**(5), pp. 516–529.

Critical Art Ensemble [CAE] (1995) *Electronic civil disobedience and other unpopular ideas*. Brooklyn, NY: Autonomedia.

Critical Art Ensemble [CAE] (2001) *Digital resistance: explorations in tactical media*. Brooklyn, NY: Autonomedia.

Critical Art Ensemble [CAE] (2006) *Marching plague: germ warfare and global public health*. Brooklyn, NY: Autonomedia.

Critical Art Ensemble [CAE] (2016) *Critical Art Ensemble* [online]. [Accessed 22 January 2016]. Available from: http://critical-art.net/home.html.

Critical Art Ensemble [CAE] (2017) *Flesh machine, 1997–98* [online]. [Accessed 20 February 2017]. Available from: http://critical-art.net/?p=101.

Cross, R., Borgatti, S. P. and Parker, A. (2002) Making visible work invisible: using social network analysis to support strategic collaboration. *California Management Review*, **44**(2), pp. 25–46.

Daniels, S. (1993) *Fields of vision: landscape imagery and national identity in England and the United States*. Princeton, NJ: Princeton University Press.

Davies, G. (2000) Narrating the natural history unit: institutional orderings and spatial strategies. *Geoforum*, **31**(4), pp. 539–551.

Davies, G. (2003) A geography of monsters? *Geoforum*, **34**(4), pp. 409–412.

Davies, G. (2010) Where do experiments end? *Geoforum*. **41**(5), pp. 667–670.

Davies, G. (2011) Molecular life. In: Del Casino Jr., V. J., Thomas, M., Cloke, P. and Panelli, R. (eds.) *A companion to social geography*. Oxford: Blackwell, pp. 257–274.

Davies, G. (2012) What is a humanized mouse? Remaking the species and spaces of translational medicine. *Body and Society*, **18**(3–4), pp. 126–155.

Davies, G. (2013) Writing biology with mutant mice: the monstrous potential of post genomic life. *Geoforum*, **48**, pp. 268–278.

Davies, G. (2014) Searching for GloFish®: aesthetics, ethics, and encounters with the neon baroque. *Environment and Planning A*, **46**(11), pp. 2604–2621.

Davies, G. and Dwyer, C. (2007) Qualitative methods: are you enchanted or are you alienated? *Progress in Human Geography*, **31**(2), pp. 257–266.

Davies, G. and Dwyer, C. (2008) Qualitative methods II: minding the gap. *Progress in Human Geography*, **32**(3), pp. 399–406.

Davis, N. (2016) Dynamic new exhibition centre to bring cutting-edge technology to the public. *The Guardian* [online], 12 January. [Accessed 03 March 2017]. Available from: https://www.theguardian.com/technology/2016/jan/12/arts-catalyst-centre-art-science-technology-kings-cross.

Davis, O. (2010) *Jacques Rancière*. Cambridge: Polity Press.

Debatty, R. (2012) *Dark places and experimental geography: interview with Neal White* [online]. [Accessed 15 December 2015]. Available from: http://we-make-money-not-art.com/the_office_of_experiments/.

De Certeau, M. (1984) *The Practice of Everyday Life*. Los Angeles and Berkeley, CA: University of California Press.

Defence Science Technology Laboratory [DSTL] (2016) *The truth about Porton Down* [online]. [Accessed 15 April 2017]. Available from: https://www.gov.uk/government/news/the-truth-about-porton-down.

DeLyser, D. (2009) Writing qualitative Geography. In: DeLyser, D., Herbert, S., Aitken, S., Crang, M. and McDowell, L. (eds.) *The Sage handbook of qualitative geography*, London: Sage, pp. 341–358.

DeLyser, D. and Hawkins, H. (2014) Introduction: writing creatively – process, practice, and product. *cultural geographies*, **21**(1), pp. 131–134.

Democracy Now! (2008) *Art in a time of terror: acclaimed art professor Steve Kurtz on how he became a 'bioterrorism' suspect after his wife died in her sleep* [online]. [Accessed 03 October 2016]. Available from: http://www.democracynow.org/2008/6/16/art_in_a_time_of_terror.

Derrida, J. (1976) *Of grammatology*. Baltimore, MD: Johns Hopkins University Press.

Derrida, J. (1989) *Edmund Husserl's 'An Origin of Geometry': an introduction*. Lincoln, NE: University of Nebraska Press. Originally published in 1962.

Derrida, J. (1995) Archive fever: a Freudian impression. *Diacritics*, **25**(2), pp. 9–63.

DeSilvey, C. (2006) Observed decay: telling stories with mutable things. *Journal of Material Culture*, **11**(3), pp. 318–338.

DeSilvey, C. (2007a) Art and archive: memory-work on a Montana homestead. *Journal of Historical Geography*, **33**(4), pp. 878–900.

DeSilvey, C. (2007b) Salvage memory: constellating material histories on a hardscrabble homestead. c*ultural geographies*, **14**(3), pp. 401–423.

Dewey, J. (2002) *Human nature and conduct*. Amherst: Prometheus Books. Originally published in 1922.

Dixon, D. P. (2009) Creating the semi-living: on politics, aesthetics and the more-than-human. *Transactions of the Institute of British Geographers*, **34**(4), pp. 411–425.

Dixon, D. P., Hawkins, H. and Straughan, E. R. (2012) Wonder-full geomorphology: sublime aesthetics and the place of art. *Progress in Physical Geography*, **37**(2), pp. 227–247.

Dixon, D., Hawkins, H. and Straughan, E. R. (2013) Of human birds and living rocks: remaking aesthetics for post-human worlds. *Dialogues in Human Geography*, **2**(3), pp. 249–270.

Doherty, C. 2004. The institution is dead! Long live the institution! Contemporary art and new institutionalism. *Engage*, **15**, pp. 6–13.

Dowling, T. (2008) Cleared: the artist the FBI branded a bio-terrorist. *The Guardian* [online], 23 April. [Accessed 8 February 2016]. Available from: http://www.theguardian.com/artanddesign/artblog/2008/apr/23/clearedtheartistthefbibra.

Driver, F. (2013) Hidden histories made visible? Reflections on a geographical exhibition. *Transactions of the Institute of British Geographers*, **38**(3), pp. 420–435.

Duncan, J. (2003) Representing empire at the National Maritime Museum. In: Peckham, R. (ed.) *Rethinking heritage: cultures and politics in Europe*. London: IB Tauris, pp. 17–28.

Dwyer, C. and Davies, G. (2010) Qualitative methods III: animating archives, artful interventions and online environments. *Progress in Human Geography*, **34**(1), pp. 88–97.

Ede, S. (2002) Science and the contemporary visual arts. *Practical Perspective*, **11**(1), pp. 65–78.

Edensor, T. (2005) The ghosts of industrial ruins: ordering and disordering memory in excessive space. *Environment and Planning D: Society and Space*, **23**(6), pp. 826–49.

Ekinsmyth, C. (2002) 16: feminist methodology. In: Shurmer-Smith, P. (ed.) *Doing cultural geography*. London: Sage, pp. 178–185.

Eleey, P. (2007) Context is half the work. *Frieze*, December 2007 [online]. [Accessed 28 February 2016]. Available from: http://www.frieze.com/issue/article/context_is_half_the_work/.

Emerson, R.M., Fretz, R.I. and Shaw, L.L. (2011) *Writing ethnographic fieldnotes*. 2nd edition, London: University of Chicago Press.

Engelmann, S. (2015) Toward a poetics of air: sequencing and surfacing breath. *Transactions of the Institute of British Geographers*, **40**(3), pp. 430–444.

Engelmann, S. (2016a) Cosmic circuitry. *Volume*, **47**, pp. 43–48.

Engelmann, S. (2016b) Social spiders and hybrid webs at Studio Tomás Saraceno. *cultural geographies*, **24**(1), pp. 161-169.

England, K. (2001) Interviewing elites: cautionary tales about researching women managers in Canada's banking industry. In: Moss, P. (ed.) *Feminist geography in practice: research and methods*. Oxford: Blackwell, pp. 200–213.

Enigbokan, A. and Patchett, M. (2011) Speaking with specters: experimental geographies in practice. c*ultural geographies*, **19**(4), pp. 535–546.

Evans, J. and Karvonen, A. (2011) Living laboratories for sustainability: exploring the politics and epistemology of urban transition. In: Bulkeley, H., Castán Broto, V., Hodson, M. and Marvin, S. (eds.) *Cities and low carbon transitions*. London: Routledge, pp. 126–141.

Evans, J., Cook, I. and Griffiths, H. (2008) Creativity, group pedagogy and social action: a departure from Gough. *Educational philosophy and theory*, **40**(2), pp. 330–345.

Evans, R. and Collins, H. (2007) Expertise: from attribute to attribution and back again? In: Hackett, E. J., Amsterdamska, O., Lynch, M. and Wajcman, J. (eds.) *The handbook of science and technology studies*. 3rd edition, Cambridge, MA: MIT University Press, pp. 609–630.

Exchange Values (2016) *Exchange values [on the table]* [online]. [Accessed 14 February 2017]. Available from: http://exchange-values.org/#.

Ferro-Thomsen, M. (2005) *Organisational art: a study of art at work in organisations* [online]. [Accessed 14 December 2016]. Available from: http://samf.ku.dk/pkv/faerdige_projektopgaver/134/134_samlet_pdf_til_web.pdf.

Fisher, L. (2003) Heidegger's hermeneutic circle. *Eidos*, **17**(2), pp. 99–111.

Flintham, M. (2012) *The military-pastoral complex: contemporary representations of militarism in the landscape* [online]. [Accessed 01 November 2016]. Available from: http://fotomuseum.adlibhosting.com/texts/Tate_Papers_17_2012_Matthew%20Flintham_The%20Military-Pastoral%20Complex%20-%20Contemporary%20Representations%20of%20Militarism%20in%20the%20Landscapein%20the%20Landscape_[ocr][o].pdf.

Flood, A. (2016) ‘Post-truth’ named word of the year by Oxford Dictionaries. *The Guardian* [online], 15 November. [Accessed 20 April 2017]. Available at: https://www.theguardian.com/books/2016/nov/15/post-truth-named-word-of-the-year-by-oxford-dictionaries.

Forsyth, I. (2011) GeoHumanities: art, history, text at the edge of place. *Scottish Geographical Journal*, **127**(3), pp. 251–253.

Forsyth, I. (2013) Subversive patterning: the surficial qualities of camouflage. *Environment and Planning A*, **45**(5), pp. 1037–1052.

Forsyth, I. (2014) Designs on the desert: camouflage, deception and the militarization of space. c*ultural geographies*, **21**(2), pp. 247–265.

Forsyth, I., Lorimer, H., Merriman, P. and Robinson, J. (2013) What are surfaces? *Environment and Planning A*, **45**(5), pp. 1013–1020.

Forsyth, I. M. (2012) *From dazzle to the desert: a cultural-historical geography of camouflage*. Ph.D. thesis, University of Glasgow.

Foster, K. and Lorimer, H. (2007) Some reflections on art-geography as collaboration. *cultural geographies*, **14**(3), pp. 425–432.

Foucault, M. (1977) *Discipline and punish: the birth of the prison*. New York, NY: Pantheon. Originally published in 1975.

Foucault, M. (1978) *The history of sexuality, vol. I: an introduction*. Harmondsworth: Penguin.

Foucault, M. (1980a) Two lectures. In: Gordon, C. (ed.) *Power/knowledge*. Brighton: Harvester, pp. 80–105.

Foucault, M. (1980b) The eye of power. In: Gordon, C. (ed.) *Power/knowledge*. Brighton: Harvester, pp. 147–165.

Foucault, M. (1988) Critical theory/intellectual theory: interview with Gerard Raulet. In: Kritzman, L. (ed.) *Michel Foucault: politics, philosophy, culture: interviews and other writings, 1977–1984*. London: Routledge, pp. 20–47.

Foundation for Art and Creative Technology [FACT] (2017) *The Office of Experiments – Truth Serum* [online]. [Accessed 7 April 2017]. Available at: http://www.fact.co.uk/projects/sk-interfaces/the-office-of-experiments-truth-serum.aspx.

Friedrichs, J. (2011) Peak energy and climate change: the double bind of post-normal science. *Futures*, **43**(4), pp. 469-477.

Gablik, S. (1992) Connective aesthetics. *American Art*, **6**(2), pp. 2–7.

Gallagher, M. (2015) Sounding ruins: reflections on the production of an 'audio drift'. *cultural geographies*, **22**(3), pp. 467–485.

Gallagher, M. and Prior, J. (2013) Sonic geographies: exploring phonographic methods. *Progress in Human Geography*, **38**(2), pp. 267–284.

Garrett, B. L. (2013) Worlds through glass: photography and video as geographic method. In Ward, K. (ed.) *Researching the City*. London: Sage, pp. 135-152.

Geoghegan, H. (2009) 'If you can walk down the street and recognise the difference between cast iron and wrought iron, the world is altogether a better place': being enthusiastic about industrial archaeology. *M/C Journal: A Journal of Media and Culture*, **12**(2), no page numbers available.

Geoghegan, H. (2010) Museum geography: exploring museums, collections and museum practice in the UK. *Geography Compass*, **4**(10), pp. 1462–1476.

Geoghegan, H. and Hess, A. (2015) Object-love at the Science Museum: cultural geographies of museum storerooms. *cultural geographies*, **22**(3), pp. 445–465.

Geoghegan, H. and Woodyer, T. (2014) Cultural geography and enchantment: the affirmative constitution of geographical research. *Journal of Cultural Geography*, **31**(2), pp. 218–229.

Goldman, A. (2005) The aesthetic. In: Gaut, B. and McIver Lopes, D. (eds.) *The Routledge companion to aesthetics*. 2nd edition, Abingdon and New York, NY: Routledge, pp. 255–266.

Goldstein, J. and Johnson, E. (2014) Biomimicry: new natures, new enclosures. *Theory, Culture and Society*, **32**(1), pp. 61–81.

Gould, S. (2005) *A science that isn't a science: a tale of attempted self-experimentation* [online]. [Accessed 11 January 2016]. Available from: http://www.nealwhite.org/self-experiment.html.

Griggs, J. (2010) *In search of the cold war's dark places* [online]. [Accessed 7 January 2016]. Available from: https://www.newscientist.com/blogs/culturelab/2010/02/in-search-of-dark-places.php.

Grodin, M. A. (1992) Historical origins of the Nuremberg code. In: Annas, G. J. and Grodin, M. A. (eds) *The Nazi doctors and the Nuremberg code: human rights in human experimentation*. New York: Oxford University Press, pp. 121-144.

Gross, M. (2009) Collaborative experiments: Jane Addams, Hull House and experimental social work. *Social Science Information*, **48**(1), pp. 81–95.

Gross, M. (2010) *Ignorance and surprise: science, society and ecological design*. Cambridge, MA: London MIT Press.

Hacking, I. (1983) *Representing and intervening: introductory topics in the philosophy of natural science*. Cambridge: Cambridge University Press.

Hacking, I. (1999) *The social construction of what?* Cambridge: Harvard University Press.

Hage, G. (2005) A not so multi-sited ethnography of a not so imagined community. *Anthropological Theory*, **5**(4), pp. 463–475.

Haraway, D. J. (1989) *Primate visions: gender, race and nature in the world of modern science.* London: Routledge.

Harvey, D. (1990) Between space and time: reflections on the geographical imagination. *Annals of the Association of American Geographers*, **80**(3), pp. 418–434.

Harvey, P. (2005) Memorialising the future: the Museum of Science and Industry in Manchester. In: Bouquet, M. and Porto, N. (ed.) *Science, magic and religion: the ritual processes of museum magic*. Oxford: Berghahn Books, pp. 29–50.

Hawkins, H. (2010a) 'The argument of the eye'? The cultural geographies of installation art. *cultural geographies*, **17**(3), pp. 321–340.

Hawkins, H. (2010b) Turn your trash into…rubbish, art and politics: Richard Wentworth's geographical imagination. *Social and Cultural Geography*, **11**(8), pp. 805–827.

Hawkins, H. (2010c) Placing art at the Royal Geographical Society. In: Patel, V. and Ledda, T. C. (eds.) *Creative compass: new mappings by international artists*. London: RGS, pp. 7–16.

Hawkins, H. (2011a) Dialogues and doings: sketching the relationships between geography and art. *Geography Compass*, **5**(7), pp. 464–478.

Hawkins, H. (2011b) By way of conclusion: towards an analytic framework. In: Hawkins, H. *For creative geographies*. Routledge, London, pp. 237–247.

Hawkins, H. (2013) Geography and art: an expanding field – site, the body and practice. *Progress in Human Geography*, **37**(1), pp. 52–71.

Hawkins, H. (2015) Creative geographic methods: knowing, representing, intervening. On composing place and page. *cultural geographies*, **22**(2), pp. 247–268.

Hawkins, H. and Lovejoy, A. (2009) *Insites: an artists' book*. Penryn: Insites Press.

Hawkins, H. and Straughan, E. (eds.) (2015) *Geographical aesthetics: imagining space, staging encounters*. London and New York, NY: Routledge.

Hawkins, H., Cabeen, L., Callard, F., Castree, N., Daniels, S., DeLyser, D., Munro Neely, H. and Mitchell, P. (2015) What might GeoHumanities do? Possibilities, practices, publics and politics. *GeoHumanities*, **1**(2), pp. 211–232.

Hay, I. (2010) *Qualitative research methods in human geography*. Oxford: Oxford University Press.

Hayes-Conroy, J. and Hayes-Conroy, A. (2010) Visceral geographies: mattering, relating, and defying. *Geography Compass*, **4**(9), pp. 1273–1283.

Heidegger, M. (1977) The age of the world picture. In: Heidegger, M. *The question concerning technology and other essays*. New York, NY: Harper and Row, pp. 115–154.

Hetherington, K. (2001) Phantasmagoria/phantasm agoria: materialities, spacialities and ghosts. *Space and Culture*. **1(**11/12): pp. 24–41.

Hill, J. (2007) The story of the amulet. *Journal of Material Culture*, **12**(1), pp. 65–87.

Hilton, M. (2004) *Consumerism in twentieth-century Britain: the search for a historical movement*. Cambridge: Cambridge University Press.

Hinchliffe, S., Kearnes, M. B., Degen, M. and Whatmore, S. (2005) Urban wild things: a cosmopolitical experiment. *Environment and Planning D: Society and Space*, **23**(5), pp. 643–658.

Hinchliffe, S., Allen, J., Lavau, S., Bingham, N. and Carter, S. (2013) Biosecurity and the topologies of infected life: from borderlines to borderlands. *Transactions of the Institute of British Geographers*, **38**(4), pp. 531–543.

Hine, C. (2007) Multi-sited ethnography as a middle range methodology for contemporary STS. *Science, Technology & Human Values*, **32**(6), pp. 652–671.

Hirsch, R. (2005) The strange case of Steve Kurtz: Critical Art Ensemble and the price of freedom. *Afterimage*. May/June, pp. 22–32. [Digital copy accessed 29 September 2016]. Available from: http://lightresearch.net/interviews/kurtz/kurtz.pdf.

Hitchings, R. (2012) People can talk about their practices. *Area*, **44**(1), pp. 61–67.

Hitt, J. (2016) The battle over the sea-monkey fortune. *The NY Times* [online] 15 April. [Accessed 14 March 2017]. Available from: https://www.nytimes.com/2016/04/17/magazine/the-battle-over-the-sea-monkey-fortune.html?_r=1.

Holloway, J. (2000) Institutional geographies of the New Age movement. *Geoforum*, **31**(4), pp. 553–565.

Hooper-Greenhill, E. (1992) *Museums and the shaping of knowledge*. New York, NY: Routledge.

Horton, J. and Kraftl, P. (2012) Clearing out a cupboard: memories and materialities. In: Jones, O. and Garde-Hansen, J. (eds.) *Geography and memory*. London: Palgrave, pp. 25–44.

Hudek, A. (2009) *The incidental person* [online]. [Accessed 03 February 2016]. Available from: http://www.apexart.org/exhibitions/hudek.htm.

Hunt, E. (2016) What is fake news? How to spot it and what you can do to stop it. *The Guardian* [online], 17 December. [Accessed 11 September 2017]. Available from: https://www.theguardian.com/media/2016/dec/18/what-is-fake-news-pizzagate.

Ingold, T. (2007) Materials against materiality. *Archaeological Dialogues*, **14**(1), pp. 1–16.

Ingold, T. (2011) *Being alive: essays on movement, knowledge and description*. Abingdon: Routledge.

Ingram, A. (2012) Experimental geopolitics: Wafaa Bilal's domestic tension. *The Geographical Journal*, **178**(2), pp. 123–133.

International School for Security and Explosives Education [ISSEE] (2016) *Untitled page* [online]. [Accessed 7 January 2016]. Available from: http://www.issee.co.uk/.

Isé, C. (2016) *Tomoko Takahashi* [online]. [Accessed 13 July 2016]. Available from: https://hammer.ucla.edu/exhibitions/2002/tomoko-takahshi/.

Institute for Applied Autonomy [IAA] (2016) *Mission* [online]. [Accessed 18 February 2016]. Available from: http://www.appliedautonomy.com/mission.html.

Ivy, A. C. (1948) The history and ethics of the use of human subjects in medical experiments. *Science*, **108**(2792), pp. 1-5.

Jackson, P. (1989) *Maps of meaning: an introduction to cultural geography*. London and New York, NY: Routledge.

Jackson, P. (2000) Rematerialising cultural geography. *Social and Cultural Geography*, **1**(1), pp. 9–14.

Jackson, S. (2011) *Social works: performing art, supporting publics*. London: Routledge.

James, S. (2013) *Artist Placement Group* [online]. [Accessed 19 April 2017]. Available from: https://frieze.com/article/artist-placement-group.

Jasanoff, S. (2005) *Designs on nature: science and democracy in Europe and the United States*. Princeton. NJ and Oxford: Princeton University Press.

Jasanoff, S. (2006) Experiments without borders: biology in the labs of life [online]. [Accessed 07 November 2016]. *LSE Public Lecture*, London School of

Economics, London. Available from: http://www2.lse.ac.uk/publicEvents/pdf/20060615_Jasanoff.pdf.

Jellis, T. (2013) *Reclaiming experiment: geographies of experiment and experimental geographies*. Ph.D. thesis, University of Oxford.

Jellis T (2015) Spatial experiments: art, geography, pedagogy. *cultural geographies in practice*, **22**(2), pp. 369–374.

John Hansard Gallery [JHG] (2009) *Artist talk, 'dark places', John Hansard Gallery, 2009* [online]. [Accessed 7 January 2016]. Available from: https://www.youtube.com/watch?v=SCl1dXyQwas.

Johnson, E. R. (2016) Reconsidering mimesis: freedom and acquiescence in the Anthropocene. *South Atlantic Quarterly*, **115**(2), pp. 267–289.

Johnson, E. R. and Goldstein, J. (2015) Biomimetic futures: life, death, and the enclosure of a more-than-human intellect. *Annals of the Association of American Geographers*, **105**(2), pp. 387–396.

Jordan, C. (2017) *Joseph Beuys and social sculpture in the United States*. Ph.D. thesis, City University of New York.

Kabakov, I. (1998) The man who never threw anything away. In: Groys, B., Ross, D. A. and Blazwick, I. (eds.) *Ilya Kabakov*. London: Phaidon Press Ltd.

Kanouse, S. (2005) Touring the archive, archiving the tour: image, text, and experience with the Center for Land Use Interpretation. *Art Journal*, **64**(2), pp. 78–87.

Kaplan, A. Y. (1990) Working in the archives. *Yale French Studies*, **77**(Reading the Archive: On Texts and Institutions), pp. 103–116.

Karp, I. (1991) Other cultures in museum perspective. In: Karp, I. and Lavine, S. D. (eds.) *Exhibiting cultures: the poetics and politics of museum display*. Washington, DC: Smithsonian Institution Press, pp. 373–385.

Karp, I. and Levine, S. D. (eds.) (1991) *Exhibiting cultures: the poetics and politics of museum display*. Washington, DC: Smithsonian Institution Press.

Kastner, J. (2005) *Jeffrey Kastner talks with Matthew Coolidge about the Center for Land Use Interpretation: true beauty* [online]. [Accessed 14 February 2016]. Available from: https://media.smith.edu/media/ereserves/pdf_files/hillyer/u-z/wagner_inside_pt5.pdf.

Katz, C. (2013) Playing with fieldwork. *Social and Cultural Geography*, **14**(7), pp. 762–772.

Kenner, M. (2006) *Insider account: clouds of secrecy* [online]. [Accessed 7 January 2016]. Available from: http://www.bbc.co.uk/insideout/east/series10/week9_spraying_war_extra.shtml.

Kester, G. H. (2004) *Conversation pieces: community and communication in modern art*. Berkeley and Los Angeles, CA: University of California Press.

Khandkar, S. H. (no date) *Open coding* [online]. [Accessed 27 January 2017]. Available from: http://pages.cpsc.ucalgary.ca/~saul/wiki/uploads/CPSC681/open-coding.pdf.

Kingsbury, P. (2010) Unearthing Nietzsche's bomb: nuance, explosiveness, aesthetics. *ACME: An International E Journal for Critical Geographies*, **9**(1), pp. 47–61.

Kirshenblatt-Gimblett, B. (1988) *Destination culture: tourism, museums and heritage*. Los Angeles, CA and London: University of California Press.

Kitcher, P. (2001) *Science, truth, and democracy*. Oxford: Oxford University Press.

Knutson, K. (2002) Creating a space for learning: curators, educators, and the implied audience. In: Leinhardt, G., Crowley, K. and Knutson, K. *Learning conversations in museums*. Mahwah, NJ: Lawrence Erlbaum Associates, Inc., pp. 5–45.

Kohler, R. E. (2002a) Place and practice in field biology. *History of Science*, **40**(2), pp. 189–210.

Kohler, R. E. (2002b) Labscapes: naturalizing the laboratory. *History of Science*, **40**(4), pp. 473–501.

Kohler, R. E. (2002c) *Landscapes and labscapes: exploring the lab-field border in biology*. Chicago, IL: University of Chicago Press.

Kohler, R.E. (2008) Lab history: reflection. *Isis*, **99**(4), pp. 761–768.

Koptyoff, I. (1986) The cultural bibliography of things: commoditization as process. In: Appadurai, A. (ed.) *The social life of things: commodities in cultural perspective*. Cambridge: Cambridge University Press, pp. 64–91.

Krauss, R. (1979) Sculpture in the expanded field. *October*, **8**, pp. 30–44.

Kukla, A. (2000) *Social constructivism and the philosophy of science*. London and New York: Routledge.

Kullman, K. (2013) Geographies of experiment/experimental geographies: a rough guide. *Geography Compass*, **7**(12), pp. 879–894.

Kwon, M. (1997) One place after another: notes on site specificity. *October*, **80**, pp. 85–110.

Land Systems Reference Centre [LSRC] (2016) *Defence and Security* [online]. [Accessed 7 January 2016]. Available from: http://www.soprasteria.co.uk/docs/librariesprovider41/brochures/sopra-steria-mod-lsrc-test-and-reference-facility.pdf?sfvrsn=0.

Lane, S. N., Odoni, N., Landström, C., Whatmore, S. J., Ward, N. and Bradley, S. (2011) Doing flood risk science differently: an experiment in radical scientific method. *Transactions of the Institute of British Geographers*, **36**(1), pp. 15–36.

Langlitz, N. (2007) The office of experiments' truth serum threat: notes on the psychopharmacology of truthfulness. In: Hauser, J. (ed.) *Sk-interfaces:*

exploding borders in art, technology and society. FACT/Liverpool University Press: Liverpool, pp. 118–124.

Larsen, L. B. (1999) Social aesthetics. In: Bishop, C. (ed.) *Participation: documents of contemporary art.* London and Cambridge, MA: MIT Press.

Last, A. (2010) On fabricating invisibility: the office of experiments' secrecy and technology bus tour. 24 January 2010. *Mutable Matter* [online]. [Accessed 12 February 2017]. Available from: https://mutablematter.wordpress.com/2010/01/24/on-fabricating-invisibility-the-office-of-experiments-secrecy-and-technology-bus-tour/.

Last, A. (2011) Ruinations @ AAG 2012. 1 November 2011. *Mutable Matter* [online]. [Accessed 13 November 2016]. Available from: https://mutablematter.wordpress.com/2011/11/01/ruinations-aag-2012/.

Last, A. (2012a) Mutable matter: using sensory methods in public engagement with nanotechnology. *Leonardo*, **45**(2), pp. 132–139.

Last, A. (2012b) Experimental geographies. *Geography Compass*, **6**(12), pp. 706–724.

Last, A. (2015) Can activists and academics talk to one another? 15 December 2015, *Mutable Matter* [online]. [Accessed 13 January 2016]. Available from: https://mutablematter.wordpress.com/2015/12/15/can-activists-and-academics-talk-to-one-another/.

Last, A. (2016a) RGS-IBG 2016 CFP: parallel institutions – models and realities, strategies and tactics, islands and archipelagos. 1 February 2016, *Mutable Matter* [online]. [Accessed 05 October 2016]. Available from: https://mutablematter.wordpress.com/2016/02/01/rgs-ibg-2016-cfp-parallel-institutions-models-and-realities-strategies-and-tactics-islands-and-archipelagos/.

Last, A. (2016b) *No title given*. Royal Geographical Society with the Institute of British Geographers Annual International Conference 2016, 30 August–2 September, London.

Latham, A. (2003) Research, performance, and doing human geography: some reflections on the diary-photograph, diary-interview method. *Environment and Planning A*, **35**(11), pp. 1993–2017.

Latham, J. (1970) *Least event, one second drawings, blind work, 24 second painting*. London: Lisson Publications.

Latham, J. and Steveni, B. (1980) Art as social strategy in institutions and organisation – with the Artist Placement Group (APG) London. Text submitted to Zentrum für Kulturforschung in Bonn.

Latour, B. (1988) *The pasteurization of france.* Cambridge, MA: Harvard University Press.

Latour, B. (1999) *Pandora's hope: essays on the reality of science studies*. Cambridge, MA: Harvard University Press.

Latour, B. (2004) *Which protocol for the new collective experiments?* [online]. [Accessed 29 November 2016]. Available from: http://www.bruno-latour.fr/sites/default/files/P-95-METHODS-EXPERIMENTS.pdf.

Latour, B. (2005a) *Re-assembling the social: an introduction to actor-network theory*. Oxford: Oxford University Press.

Latour, B. (2005b) Introduction to part II: why is it so difficult to trace the social? In: Latour B. (ed.) *Reassembling the social: an introduction to actor-network theory*. Oxford: Oxford University Press, pp. 159–164.

Latour, B. and Yaneva, A. (2008) Give me a gun and I will make buildings move: an ANT's view of architecture. In: Geiser, R. (ed.) *Explorations in architecture: teaching, design, research*. Basel, Switzerland: Birkhäuser, pp. 80–89.

Law, J. (1994) *Organising modernity*. Oxford: Blackwells.

Law, J. (2004) *After method: mess in social science research*. London: Routledge.

Law, J. and Singleton, V. (2000) Performing technology's stories: on social constructivism, performance, and performativity. *Technology and Culture*, **41**(4), pp. 765–775.

Lawson, V. (2000) Arguments within geographies of movement: the theoretical potential of migrants' stories. *Progress in Human Geography*, **24**(2), pp. 173–189.

Lederer, S. (1995) *Subjected to science: human experimentation in America before the Second World War*. Baltimore, MD: John Hopkins University Press.

Lemov, R. (2005) *World as laboratory: experiments with mice, mazes, and men*. New York: Hill and Wang.

Lind, M., Wood, B. K. and von Bismarck, B. (2010) *Selected Maria Lind writings*. New York: Sternberg Press.

Lippard, L. R. (1997) *Six years: the dematerialization of the art object from 1966 to 1972*. Berkeley, CA: University of California Press.

Llewelyn, J. (1986) *Derrida on the threshold of sense*. Basingstoke: Palgrave Macmillan.

Locke, S. (2002) The public understanding of science: a rhetorical invention. *Science, Technology and Human Values*, **27**(1), pp. 87–111.

Longhurst, R. (2008) The geography closest in-the body...the politics of pregnibility. *Australian Geographical Studies*, **32**(2), pp. 214–223.

Longhurst, R., Ho, E. and Johnston, L. (2008) Using 'the body' as an 'instrument of research': kimch'i and pavlova. *Area*, **40**(2), pp. 208–217.

Lorimer, H. (2003) Telling small stories: spaces of knowledge and the practice of geography. *Transactions of the Institute of British Geographers*, **28**(2), pp. 197–217.

Lorimer, H. (2009) Caught in the nick of time: archives and fieldwork. In: Aitken, S., Crang, M., DeLyser, D., Herbert, S. and McDowell, L. (eds.) *The Sage handbook of qualitative research in human geography*. London: Sage, pp. 248–272.

Lorimer, H. and MacDonald, F. (2002) A rescue archaeology, Taransay, Scotland. *cultural geographies*, **9**, pp. 95–103.

Lorimer, J. (2012) Multinatural geographies for the Anthropocene. *Progress in Human Geography*, **36**(5), pp. 593–612.

Lorimer, J. and Driessen, C. (2014) Wild experiments at the Oostvaardersplassen: rethinking environmentalism in the Anthropocene. *Transactions of the Institute of British Geographers*, **39**(2), pp. 169–181.

Lovejoy, A. (2017) *insites – a notebook* [online]. [Accessed 12 April 2017]. Available from: http://www.annielovejoy.net/cgi-bin/showproject.pl?title=insites%20-%20a%20notebook.

Lovejoy, A. and Dunlop, M. (2017) *Annie Lovejoy & Mac Dunlop* [online]. [Accessed 12 April 2017]. Available from: http://rane.falmouth.ac.uk/lovejoy_dunlop_details.html.

Luhmann, N. (1993) Deconstruction as second-order observing. *New Literary History*, **24**(4), pp. 763–782.

Luhmann, N. (1998) *Observations on modernity*. Stanford, CA: Stanford University Press.

Lutz, W., Sanderson, W. and Scherbov, S. (2001) The end of world population growth. *Nature*, **412**, pp. 543-545.

Macdonald, S. (2002) *Behind the scenes at the Science Museum*. Oxford: Berg Publishers.

Macdonald, S. (2005) Enchantment and its dilemmas: the museum as a ritual site. In: Bouquet, M. and Porto, N. (eds.) *Science, magic and religion: the ritual processes of museum magic*. Oxford: Berghahn Books, pp. 209–228.

Macdonald-Munro, I. (2004) *Introduction to flat time* [online]. [Accessed 09 November 2016]. Available from: http://www.theleastevent.com/introduction.htm.

Macdonald-Munro, I. (2008) John Latham. *Third Text*, **22**(2), pp. 163–175.

Mace, M. A. and Ward, T. (2002) Modeling the creative process: a grounded theory analysis of creativity in the domain of art making. *Creativity Research Journal*, **14**(2), pp. 179–192.

Mackenzie, A. F. D. (2004) Place and the art of belonging. *cultural geographies*, **11**(2), pp. 115–137.

MacLeod, R. (2001) 'Strictly for the birds': science, the military and the Smithsonian's Pacific Ocean Biological Survey Program, 1963-1970. *Journal of the History of Biology*, **34**, 315-352.

Madge, C. (2014) On the creative (re)turn to geography: poetry, politics and passion. *Area*, **46**(2), pp. 178–185.

Makers of Waag Society (2012) *Richard Pell at Waag 2012 POST NAT History Exhibition Lecture 1* [online]. [Accessed 03 December 2014]. Available from: http://vimeo.com/56855772.

Mandelbrojt, J. (2011) *La science (n')e(s)t (pas) l'art: brèves rencontres (review by Levy-blonde, J-M.)* [online]. [Accessed 17 November 2015, English version]. Available from: http://www.leonardo.info/reviews/apr2011/levy-leblond_mandelbrojt.php.

Mann, J. (2015) Towards a politics of whimsy: yarn bombing the city. *Area*, **47**(1), pp. 65–72.

Mar, P. and Anderson, K. (2012) Urban curating: the 'interspaces' of art collaboration in Western Sydney. *Space and Culture*, **15**(4), pp. 330-343.

Marcus, G. E. (1995) Ethnography in/of the world system: the emergence of multi-sited ethnography. *Annual Review of Anthropology*, **24**, pp. 95–117.

Marcus, G. E. (1998) *Ethnography through thick and thin*. Princeton, NJ: Princeton University Press.

Marcus, G.E. (2016) Art (and anthropology) at the World Trade Organization: chronicle of an intervention. *Ethnos*, Doi: 10.1080/00141844.2015.1052084.

Mareis, C., Dombois, F. and Schwab, M. (eds.) (2011) *Intellectual birdhouse: artistic practice as research*. London: Koenig Books.

Marston, S. A. and De Leeuw, S. (2013) Creativity and geography: toward a politicized intervention. *Geographical Review*, **103**(2), pp. iii–xxvi

Matless, D. (1997) The geographical self, the nature of the social and geoaesthetics: work in social and cultural geography. *Progress in Human Geography*, **21**(3), pp. 393–405.

Maugh II, T. H. (2001) Five Californians named MacArthur Award Fellows. *Los Angeles Times*, 24 October 2001 [online]. [Accessed 15 February 2016]. Available from: http://articles.latimes.com/2001/oct/24/local/me-61000.

Mauthner, N. S. and Doucet, A. (2008) 'Knowledge once divided can be hard to put together again': an epistemological critique of collaborative and team-based research practices. *Sociology*, **42**(5), pp. 971–985.

May, C. and Finch, T. (2009) Implementing, embedding, and integrating practices: an outline of normalisation process theory. *Sociology*, **43**(3), pp. 535–554.

McCormack, D. (2010) Thinking in transition: the affirmative refrain of experience/experiment. In: Anderson, B. and Harrison, P. (eds) *Taking-place: non-representational theories and geography*. Farnham: Ashgate, pp. 201–220.

McFarlane, C. (2011) *Learning the city: knowledge and translocal assemblage*. Oxford: Wiley Blackwell.

McKenzie, J. and Schneider, R. (2000) Critical art ensemble: tactical media practitioners: an interview by Jon McKenzie and Rebecca Schneider. *The Drama Review*, **44**(4) [T168], 136–150.

McKibben, B. (2017) Stop talking right now about the threat of climate change. It's here; it's happening. *The Guardian* [online], 11 September. [Accessed 11 September 2017]. Available from: https://www.theguardian.com/commentisfree/2017/sep/11/threat-climate-change-hurricane-harvey-irma-droughts.

McLaughlin. K. (2006) Dead mice on toast? Jurassic oddities make museum an unusual experience. *Daily Breeze*, 5 May 2006 [online]. [Accessed 15 February 2016]. Available from: http://www.kellyyounger.net/pdf/Dead%20mice%20on%20toast.pdf

McMorran, C. (2012) Practising workplace geographies: embodied labour as method in human geography. *Area*, **44**(4), pp. 489–495.

McNiff, S. (ed.) (2013) *Art as research: opportunities and challenges*. Bristol: Intellect Ltd.

Merriman, P. (2012) *Mobility, space and culture*. London: Routledge.

Meyer, M. (2007) Give me a museum and I will raise the world. *Nature Behind Glass* conference, 6–8 September, Manchester Museum.

Meyer, M. (2012) Placing and tracing absence: a material culture of the immaterial. *Journal of Material Culture*, **17**(3), pp. 103–110.

Meyer, M. (2016) A space for silence: exhibiting and materialising silence through technology. *cultural geographies*, **23**(2), pp. 321–336.

Meyer, M. and Woodthorpe, K. (2008) The material presence of absence: a dialogue between museums and cemeteries. *Sociological Research Online*, **13**(5), page numbers unavailable.

Miller, A. (2017) Creative geographies of ceramic artists: knowledges and experiences of landscape, practices of art and skill. *Social and Cultural Geography*, **18**(2), pp. 245-267.

Miller, D. (2008) *The comfort of things*. Cambridge: Polity.

Mills, A.J., Durepos, G. and Wiebe, E. (eds.) (2010) *Encyclopedia of case study research*. London: Sage.

Mills, S. (2003) Power and Institutions. In: Mills, S. *Michel Foucault (Routledge Critical Thinkers)*. London: Routledge, pp. 33–52.

Mills, S. (2013) Cultural-historical geographies of the archive. *Geography Compass*, **7**(10), pp. 701–713.

Mitchell, D. (2007) Work, struggle, death, and geographies of justice: the transformation of landscape in and beyond California's imperial valley. *Landscape Research*, **32**(5), pp. 559–577.

Monaghan, A. (2016) Income inequality still at record levels, says OECD. *The Guardian* [online], 24 November. [Accessed 11 September 2017]. Available from: https://www.theguardian.com/business/2016/nov/24/income-inequality-oecd-financial-crisis.

Morris, N. (2011) Night walking: darkness and sensory perception in a night-time landscape installation. c*ultural geographies*, **18**(3), pp. 315–342.

Morris, N. J. and Cant, S. G. (2006) Engaging with place: artists, site-specificity and the Hebden Bridge Sculpture Trial. *Social and Cultural Geography*, **7**(6), pp. 863–888.

Morton, K. J. P. (2014) *Anti-ageing and women's bodies: spaces, practices, and knowledges of cosmetic intervention*. Ph.D. thesis, University of Exeter.

Mosley, M. (2016) *Inside Britain's secret weapons research facility* [online]. [Accessed 29 August 2016]. Available from: http://www.bbc.co.uk/news/magazine-36606510.

Müller-Wille, S. (2007) Collection and collation: theory and practice of Linnaean botany. *Studies in History and Philosophy of Biological and Biomedical Sciences*, **38**(3), pp. 541–562.

Nabulime, L. and McEwan, C. (2010) Art as social practice: transforming lives using sculpture in HIV/AIDS awareness and prevention in Uganda. *cultural geographies*, **18**(3), pp. 275–296.

Nadai, E. and Maeder, C. (2005) Fuzzy fields: multi-sited ethnography in sociological research. *Forum: Qualitative Social Research*, **6**(3), Art 28, page numbers unavailable.

Nagasawa, Y. (2000) The geography of hospitals: a developing approach to the architectural planning of hospitals. In: Wapner, J., Demick, T., Yamamoto, T. and Minami, H. (eds.) *Theoretical perspectives in environment-behaviour research: underlying assumptions, research problems and methodologies*. New York: Kluwer Academic, pp. 217–227.

Neal White [NW] (2016) *Past works/research* [online]. [Accessed 29 October 2016]. Available from: http://www.nealwhite.org/bio.html.

Neal White [NW] (2017) *Soda (1997–2002–2008)* [online]. [Accessed 21 February 2017]. Available from: http://www.nealwhite.org/soda.html.

Neville, B. and Villeneuve, J. (2002) *Waste-site stories: the recycling of memory*. Albany, NY: State University of New York Press.

Niedomsyl, T., Östh, J. and van Ham, M. (2010) The globalisation of marriage fields: the Swedish case. *Journal of Ethnic and Migration Studies*, **36**(7), pp. 1119–1138.

Norman, M. (2016) Whoever wins the US presidential election, we've entered a post-truth world – there's no going back now. *The Independent*, 8 November 2016 [online]. [Accessed 20 April 2017]. Available from: http://www.independent.co.uk/voices/us-election-2016-donald-trump-hillary-clinton-who-wins-post-truth-world-no-going-back-a7404826.html.

Nowotny, H. (1999) The need for socially robust knowledge. *TA-Datenbank-Nachrichten*, **3-4**(8), pp. 12-16.

Nowotny, H. (2003) Democratising expertise and socially robust knowledge. *Science & Public Policy*, **30**(3), pp.151-156.

Objectif Exhibitions (2015) *Untitled* [online]. [Accessed 04 December 2015]. Available from: http://objectif-exhibitions.org/about/.

Office of Experiments [OOE] (2016a) *The Mike Kenner Archive* [online]. [Accessed 07 January 2016]. Available from: http://www.o-o-e.org/res-arc.html.

Office of Experiments [OOE] (2016b) *Our original principles and articles* [online]. [Accessed 05 January 2016]. Available from: http://www.o-o-e.org/principles.html.

Office of Experiments [OOE] (2016c) *About* [online]. [Accessed 31 October 2016]. Available from: http://www.o-o-e.org/index-a.html.

Office of Experiments [OOE] (2017) *Truth serum* [online]. [Accessed 7 April 2017]. Available from: http://www.o-o-e.org/exp-truth.html.

Opdenakker, R. (2006) Advantages and disadvantages of four interview techniques in qualitative research. *Forum: Qualitative Social Research/Sozialforschung*, **7**(4), art 11, page numbers unavailable.

Orb, A., Eisenhower, L. and Wynaden, D. (2000) Ethics in qualitative research. *Journal of Nursing Scholarship*, **33**(1), pp. 93–96.

Paglen, T. (2009a) *Blank spots on the map: the dark geography of the Pentagon's secret world*. London: Dutton.

Paglen, T. (2009b) *Experimental geography: from cultural production to the production of space* [online]. [Accessed 26 August 2016]. Available from: http://www.brooklynrail.org/2009/03/express/experimental-geography-from-cultural-production-to-the-production-of-space.

Pain, R. (2004) Social geography: participatory research. *Progress in Human Geography*, **28**(5), pp. 652–663.

Palsson, G., Szerszynski, B., Sörlin, S., Marks, J., Avril, B., Crumley, C., Hackmann, H., Holm, P., Ingram, J., Kirman, A., Pardo Buendia, M. and Weehuizen, R. (2013) Reconceptualizing the 'Anthropos' in the Anthropocene: integrating the social sciences and humanities in global environmental change research. *Environmental Science and Policy*, **28**, pp. 3–13.

Parr, H. (2007) Collaborative film-making as process, method and text in mental health research. c*ultural geographies*, **14**(1), pp. 114–138.

Parr, H. and Stevenson, O. (2015) 'No news today': talk of witnessing with families of missing people. cultural geographies, **22**(2), pp. 297–315.

Paskett, D. (2017) *Background information: David Paskett past president of the Royal Watercolour Society* [online]. [Accessed 3 March 2017]. Available from: http://www.davidpaskett.co.uk/about-david-paskett-fine-art-watercolour-cv.php.

Patchett, M. (2008) Tracking tigers: recovering the embodied practices of taxidermy. *Journal of Historical Geography*, **36**, pp. 17–39.

Patchett, M. (2011) Becoming geographer-artist… 14 April 2011, *Experimental Geography in Practice* [online]. [Accessed 08 November 2016]. Available from: https://merlepatchett.wordpress.com/2011/04/14/becoming-geographer-aritist/.

Patchett, M. (2014) Witnessing craft: employing video ethnography to attend to the more-than-human craft practices of taxidermy. In: Bates, C. (ed.) *Video*

methods: social science research in motion. New York, NY: Routledge, pp. 71–94.

Patchett, M. and Foster, K. (2008) Repair work: surfacing the geographies of dead animals. *Museum and Society*, **6**(2), pp. 98–122.

Patchett, M., Foster, K. and Lorimer, H. (2011) The biogeographies of a hollow-eyed harrier. In: Alberti, S. (ed.) *The afterlives of animals: a museum menagerie*. Virginia: University of Virginia Press, pp. 110–133.

Paterson, M. (2009) Haptic geographies: ethnography, haptic knowledges and sensuous dispositions. *Progress in Human Geography*, **33**(6), pp. 766–788.

Paton, D. (2013) The quarry as sculpture: the place of making. *Environment and Planning A*, **45**(5), pp 1070–1086.

Pell, R. (2015a) *A discussion of PostNatural as a category*. Lecture given to the University of Pittsburgh, 16 April 2015, Pittsburgh, PA.

Pell, R. (2015b) *Email to Derek Griesbach*. 30 April 2015.

Pell, R. W. and Allen, L. B. (2015) Bringing Postnatural history into view. *American Scientist*, **103**(3), p. 224.

Pels, D., Hetherington, K. and Vandenberghe, F. (2002) The status of the object: performances, mediations, and techniques. *Theory, Culture and Society*, **19**(5–6), pp. 1–21.

Perec, G. (1999) *Species of spaces and other pieces*. London: Penguin.

Perrottet, T. (2011) *The Museum of Jurassic Technology* [online]. [Accessed 5 February 2016]. Available from: http://www.smithsonianmag.com/arts-culture/the-museum-of-jurassic-technology-160774366/?no-ist.

Philo, C., and Parr, H. (2000) Institutional geographies: introductory remarks. *Geoforum*, **31**(4), pp. 513–521.

Pickering, A. (1995) *The mangle of practice: time, agency, and science*. Chicago, IL: University of Chicago Press.

Pickering, A. (2003) On becoming: imagination, metaphysics and the mangle. In: Ihde, D. and Selinger, E. (eds.) *Chasing technoscience: matrix of materiality*. Indiana: Indiana University Press, pp. 96–116.

Pickering, A. and Guzik, K. (eds.) (2008) *The mangle in practice: science, society and becoming*. Durham, NC: Duke University Press.

Pinney, C. (2005) Things happen: or, from which moment does that object come? In: Miller, D. (ed) *Materiality*. Durham, NC: Duke University Press, pp. 256–272.

Pitt ULS (2016a) *Can sites cultivate curiosity? Part 1* [online]. [Accessed 8 August 2016]. Available from: https://www.youtube.com/watch?v=q72j7EQkAjo.

Pitt ULS (2016b) *Can sites cultivate curiosity? Part 2* [online]. [Accessed 08 August 2016]. Available from: https://www.youtube.com/watch?v=PYGyhYnog1E.

Pittsburgh Innovators Project [PIP] (2013) *Center for PostNatural History: Pittsburgh Innovators Profile* [online]. [Accessed 03 November 2016]. Available from: https://www.youtube.com/watch?v=DF46EgDMy8Y.

Pollock, V. and Sharp, S. (2007) Constellations of identity: place-ma(r)king beyond heritage. *Environment and Planning D: Society and Space*, **25**(6), pp. 1061-1078.

Popper, K. (1968) *The logic of scientific discovery*. New York: Harper and Row.

Popular Pittsburgh [PP] (2015) *Pittsburgh: a haven for higher education* [online]. [Accessed 19 November 2015]. Available from: http://popularpittsburgh.com/pittsburgh-higher-education/.

Powell, C. R. and Vaseduvan, A. (2007) Geographies of experiment. *Environment and Planning A*, **39**(8), pp. 1790–1793.

Powell, R. (2007) Geographies of science: histories, localities, practices, futures. *Progress in Human Geography*, **31**(3), pp. 309–329.

Price, J. M. C. (2010) Coding: selective coding. In: Mills, A. J., Durepos, G. and Wiebe, E. (eds.) *Encyclopedia of case study research*. London: Sage, pp. 157-158.

Price, P. L. (2010) Cultural geography and the stories we tell ourselves. *cultural geographies*, **17**(2), pp. 203–210.

Putnam, J. (2001) *Art and artifact: the museum as medium*. New York, NY: Thames and Hudson Inc.

Rabinow, P. (2003) *Anthopos today: reflections on modern equipment*. Chicago, IL: University of Chicago Press.

Ramos, M. C. (1989) Some ethical implications of qualitative research. *Research in Nursing & Health*, **12**(1), pp. 57–63.

Ramsden, H. (2016) Walking and talking: making strange encounters within the familiar. *Social and Cultural Geography* [online]. [Accessed 08 November 2016]. Available from: http://dx.doi.org/10.1080/14649365.2016.1174284.

Rancière, J. (2002) *Aesthetics and politics: rethinking the link* (lecture). University of California, Berkeley, 30 September 2002.

Rancière, J. (2004) *The politics of the aesthetics: the distribution of the sensible*. London and New York: Continuum.

Rancière, J. (2006) Thinking between disciplines: an aesthetics of knowledge. *Parrhesia*, **1**, pp. 1–12.

Rancière, J. (2008) Aesthetic separation, aesthetic community: scenes from the aesthetic regime of art. *Art & Research: A Journal of Ideas, Contexts and Methods*, **2**(1), pp. 1–15.

Rasmussen, M. B. (2009) The politics of interventionist art: the situationist international, artist placement group, and art workers' coalition. *Rethinking Marxism*, **21**(1), pp. 34–49.

Raunig, G. (2009a) Instituent practices, no. 2: institutional critique, constituent power, and the persistence of instituting. In: Raunig, G. and Ray, G. (eds.) *Art and contemporary critical practice: reinventing institutional critique.* London: MayFly Books, pp. 173–185.

Raunig, G. (2009b) Instituent practices: fleeing, instituting, transforming. In: Raunig, G. and Ray, G. (eds.) *Art and contemporary critical practice: reinventing institutional critique.* London: MayFly Books, pp. 3–11.

Raven Row (2016) *The individual and the organisation: Artist Placement Group 1966–79* [online]. [Accessed 29 October 2016 [review of 2012 exhibition]]. Available from: http://www.ravenrow.org/exhibition/artist_placement_group/.

Rheinberger, H.-J. (1992) Experiment, difference, and writing: I. Tracing protein synthesis. *Studies in History and Philosophy of Science Part A*, **23**(2), pp. 305–331.

Rheinberger, H.-J. (1993) Experiment and orientation: early systems of in vitro protein synthesis. *Journal of the History of Biology*, **26**(3), pp. 443–471.

Rheinberger, H.-J. (1997) *Toward a history of epistemic things: synthesizing proteins in the test tube*. Stanford, CA: Stanford University Press.

Rheinberger, H.-J. (2006) The shape of experiment. In: *The Shape of Experiment*, *2-5 June 2005*, *Berlin* [online]. [Accessed 25 August 2016]. Berlin: Max Planck Institute for the History of Science, Available from: https://www.mpiwg-berlin.mpg.de/Preprints/P318.PDF.

Rheinberger, H.-J. (2008) Translating Derrida. *CR: The New Centennial Review*, **8**(3), pp. 175–187.

Ritchie, J., Lewis, J. and Elam, G. (2003) Sampling strategies for qualitative research (sub-title 'ethical considerations'). In: Ritchie, J. and Lewis, J. (eds.) *Qualitative research practice: a guide for social science students and researchers*. London: Sage, pp. 77–86.

Ronell, A. (2003) The experimental disposition: Nietzsche's discovery of America (or, why the present administration sees everything in terms of a test). *American Literary History*, **15**(3), pp. 560–574.

Ronell, A. (2005) *The test drive*. Urbana, IL: University of Illinois Press.

Rose, G. (1993) *Feminism & geography: the limits of geographical knowledge*. Oxford: Polity Press.

Rose, G. (2000) Practising photography: an archive, a study, some photographs and a researcher. *Journal of Historical Geography*, **26**(4), pp. 555–571.

Roth, M. W. (2002) The Museum of Jurassic Technology: Culver City, California. *Technology and Culture*, **43**(1), pp. 102–109.

Royal Air Force [RAF] (2017) *Station name: MoD Boscombe Down* [online]. [Accessed 15 April 2017]. Available from: http://www.raf.mod.uk/organisation/stations.cfm?selectStation=9DF3F0D3-E163-57D8-F034180194A91C7B.

Rugg, J. (2010) *Exploring site-specific art: issues of space and internationalism*. Oxford: IB Tauris.

Rugoff, R. (2006) Circling the Center. In: Coolidge, M. and Simmons, S. (eds.) *Exploring the internal fringes of America with the Center for Land Use Interpretation*. New York: Metropolis Books, pp. 34–41.

Rutherford, S. (2007) Green governmentality: insights and opportunities in the study of nature's rule. *Progress in Human Geography*, **31**(3), pp. 291-307.

Ryan, J. (2000) 'Hunting with the camera': photography, wildlife and colonialism in Africa. In: Philo, C. and Wilbert, C. (eds.) *Animal spaces, beastly places: new geographies of human–animal relations*. London: Routledge, pp. 203–221.

Sacks, S. (2007) *Exchange values: eleven years on* [online]. [Accessed 25 May 2016]. Available from: http://www.exchange-values.org/pdfs/shelleysacks1.pdf.

Sayers, S. (2005) *Jacques Rancière (2004) the politics of aesthetics: the distribution of the sensible* [online]. [Accessed 05 May 2016]. Available from: http://www.culturemachine.net/index.php/cm/article/view/190/171.

Scalway, H. (2006) A patois of pattern: pattern, memory and the cosmopolitan city. *cultural geographies*, **13**(3), pp. 451–457.

Schaaf, R., Worrall-Hood, J. and Jones, O. (2017) Geography and art: encountering place across disciplines. *cultural geographies*, **24**(2), pp. 319-327.

Schaffer, S. (1995) Where experiments end: tabletop trials in Victorian astronomy. In: Buchwald, J. (ed.) *Scientific practice: theories and stories of doing physics*. Chicago, IL: University of Chicago Press, pp. 257–299.

Science and Technology Facilities Council [STFC] (2017) *Chilbolton Observatory* [online]. [Accessed 15 April 2017]. Available from: https://www.chilbolton.stfc.ac.uk/Pages/home.aspx.

Schneider, J. W. (2005) *Donna Haraway: live theory*. New York: Continuum.

Schneider, R. (2000) Nomadmedia: on Critical Art Ensemble. *The Drama Review*, **44**(4) [T168], pp. 120–131.

Schofield, J. (2009) Constructing place: when artists and archaeologists meet. In: Schofield, J. (ed.) *Aftermath: readings in the archaeology of recent conflict*. New York: Springer, pp 185–196.

Science Museum (2014) *The rubbish collection – exhibition closed* [online]. [Accessed 13 July 2016]. Available from:

http://www.sciencemuseum.org.uk/visitmuseum/Plan_your_visit/exhibitions/rubbish_collection.

Shapin, S. and Schaffer, S. (2011) *Leviathan and the air-pump: Hobbes, Boyle, and the experimental life*. Princeton, NJ: Princeton University Press.

Shaw, W.S., DeLyser, D. and Crang, M. (2015) Limited by imagination alone: research methods in cultural geographies, **22**(2), pp. 211–215.

Sheikh, S. (2006) *Notes on institutional critique* [online]. [Accessed 20 April 2017]. Available from: http://eipcp.net/transversal/0106/sheikh/en.

Sholette, G. (2003) *Dark matter: activist art and the counter-public sphere* [online]. [Accessed 13 July 2016]. Available from: http://www.joaap.org/new3/sholette.html.

Shurmer-Smith, P. (ed.) (2002) *Doing cultural geography*. London: Sage.

Silverman, D. (2001) *Interpreting qualitative data: methods for analysing talk, text and interaction*. 2nd edition, London: Sage.

Simpson, P. (2011) So as you can see…: some reflections on the utility of video methodologies in the study of embodied practices. *Area*, **43**(3), pp. 343-352.

Simpson, P. (2012) Apprehending everyday rhythms: rhythm analysis, time-lapse photography and the space-time of 'street performance'. *cultural geographies*, **19**(4), pp. 423-445.

Sjöholm, J. (2014) The art studio as archive: tracing the geography of artistic potentiality, progress and production. *cultural geographies*, **21**(3), pp. 505–514.

Skjulstad, S., Morrison, A. and Aaberge, A. (2002) Researching performance, performing research: dance, multimedia and learning. In: Morrison, A. (ed.) *Researching ICTs in context*. Blindern: Intermedia and University of Oslo, pp. 211–248.

Slater, H. (2000) The art of governance: the Artist Placement Group 1966–1989. *Variant*, **2**(11), pp. 23–26.

Slaughter, R. A. (2012) Welcome to the Anthropocene. *Futures*, **44**(2), pp. 119–126.

Smellie, J. (2009) The British Antarctic Survey (lecture). *Polar Environments – GG23710*, given at Aberystwyth University, 26 November 2009, Aberystwyth.

Smithson, R. (1996) A sedimentation of the mind: earth projects. In: Flam, J. (ed.) *Robert Smithson: the collected writings*. Berkeley, CA: University of California Press, pp. 100–113.

Solhdju, K. (no date) *Neal White: the void* [online]. [Accessed 11 January 2016]. Available from: http://vlp.mpiwg-berlin.mpg.de/pdfgen/essays/art68.pdf.

Star, S. L. (1992) Craft vs. commodity, mess vs. transcendence: how the right tool became the wrong one in the case of taxidermy and natural history. In: Clarke, A. E. and Fujimura, J. H. (eds.) *The right tools for the job: at work in twentieth-century life sciences*. Princeton, NJ: Princeton University Press, pp. 257–286.

Star, S. L. (1999) The ethnography of infrastructure. *American Behavioural Scientist*, **43**(3), pp. 377–391.

Star, S. L. and Griesemer, J. (1989) Institutional ecology, 'translations' and boundary objects: amateurs and professionals in Berkeley's Museum of Vertebrate Zoology, 1907–39. *Social Studies of Science*, **19**(3), pp. 387–420.

Stengers, I. (1997) *Power and invention: situating science*. Minneapolis, MN and London: University of Minnesota Press.

Stengers, I. (2000) *The invention of modern science*. Minneapolis, MN: University of Minnesota Press.

Stengers, I. (2005) The cosmopolitical proposal. In: Latour, B. and Weibel, P. (eds.) *Making things public.* Cambridge, MA: MIT Press, pp. 994–1003.

Steveni, B. (2001) *Organisation + Imagination: pioneering art in the social context* [online]. [Accessed 3 February 2016]. Available from: https://s3.amazonaws.com/arena-attachments/566821/026fab1fccc53d1c09f75c76250e3ebc.pdf.

Stimson, B. and Sholette, G. (2007) *Collectivism after modernism: the art of social imagination after 1945*. Minneapolis, MN: University of Minnesota Press.

Strathern, M. (2004) *Partial connections*. Walnut Creek, CA: AltaMira Press.

Strauss, A. L. and Corbin, J. M. (1998) *Basics of qualitative research: techniques and procedures for developing grounded theory*. London: Sage.

Szary, A.-L.A. (2012) Walls and border art: the politics of art display. *Journal of Borderlands Studies*, **27**(2), pp. 213–228.

Tanke, J.J. (2011) *Jacques Rancière: an introduction – philosophy, politics, aesthetics*. London and New York: Continuum.

Tate (2016a) *Artist Placement Group* [online]. [Accessed 14 January 2016]. Available from: http://www.tate.org.uk/learn/online-resources/glossary/a/artist-placement-group.

Tate (2016b) *Artist Placement Group* [online]. [Accessed 28 February 2016]. Available from: http://www2.tate.org.uk/artistplacementgroup/chronology.htm.

Tate (2016c) *Artist Placement Group* [online]. [Accessed 30 September 2016]. Available from: http://www2.tate.org.uk/artistplacementgroup/overview.htm.

Tate (2016d) *Institutional critique* [online]. [Accessed 09 August 2016]. Available from: http://www.tate.org.uk/learn/online-resources/glossary/i/institutional-critique.

Tate (2017) *Joseph Beuys: actions, vitrines, environments: room 5* [online]. [Accessed 14 February 2017]. Available from: http://www.tate.org.uk/whats-on/tate-modern/exhibition/joseph-beuys-actions-vitrines-environments/joseph-beuys-actions-5.

TED (2015) *The way we think about work is broken: Barry Schwartz* [online]. [Accessed 07 July 2016]. Available from: https://www.youtube.com/watch?v=3B_1itqCKHo.

The art of curating (2014) BBC Radio 4. 18 March 2014, 08:20.

The Associated Press [TAP] (2008) Charge dropped against artist in terror case. *New York Times* [*NY Times*], 22 April 2008 [online]. [Accessed 03 October 2016]. Available from: http://www.nytimes.com/2008/04/22/nyregion/22bioart.html?_r=0.

The Economist (2016) Post-truth politics: art of the lie. *The Economist*, 10 September 2016 [online]. [Accessed 20 April 2017]. Available from: http://www.economist.com/news/leaders/21706525-politicians-have-always-lied-does-it-matter-if-they-leave-truth-behind-entirely-art?fsrc=scn/tw/te/pe/ed/artofthelie.

The Influencers (2004) *Institute for Applied Autonomy: part 1* [online]. [Accessed 19 February 2016]. Available from: http://theinfluencers.org/en/institute-applied-autonomy/video/1.

The Influencers (2014) *Center for PostNatural History: part 1* [online]. [Accessed 18 November 2015]. Available from: http://theinfluencers.org/en/center-for-postnatural-history/video/1.

Thomas, M. (2007) Kurtz case, activist art in limbo. *Pittsbugh Post-Gazette*, 7 March 2007 [online]. [Accessed 20 April 2017]. Available from: http://www.post-gazette.com/frontpage/2007/03/07/Kurtz-case-activist-art-in-limbo/stories/200703070200.

Thompson, N. and Independent Curators International [ICI] (2009) *Experimental geography: radical approaches to landscape, cartography, and urbanism*. Brooklyn, NY: Melville House.

Thrift, N. (2003) Practising ethics. In: Pryke, M., Rose, G. and Whatmore, S. (eds.) *Using social theory*. London: Sage, pp. 105–121.

Thrift, N. (2007) *Non-representational theory: space, politics, affect*. London: Routledge.

Thrift, N., Driver, F. and Livingstone, D. (1995) The geography of truth. *Environment and Planning D: Society and Space*, **13**, pp. 1-3.

Tilley, C. (2004) *The materialities of stone: explorations of landscape phenomenology*. Oxford: Berg.

Tisdall, C. (1979) *Joseph Beuys* [Exhibition catalogue]. Solomon R. Guggenheim Museum, New York: Thames & Hudson.

Tolia-Kelly D. (2011) The geographies of cultural geography III: material geographies, vibrant matters and risking surface geographies. *Progress in Human Geography*, **37**(1), pp. 153–160.

Tolia-Kelly, D. (2016) Anthropocenic culturecide: an epitaph. *Social and Cultural Geography*, **17**(6), pp. 786–792.

Tooke, J. (2000) Institutional power-geometries: enduring and shifting work relations in cleansing depots. *Geoforum*, **31**(4), pp. 567–574.

Triscott, N. (2008) Instruments and spaces of curation: artists in the polar regions. *Engage: the international journal of visual art and gallery education*, (21), page numbers unavailable.

Triscott, N. (2012) *Let's experiment with ourselves* [online]. [Accessed 29 February 2016]. Available from: http://nicolatriscott.org/2012/02/04/lets-experiment-with-ourselves/.

Turner, J. (1980) *Reckoning with the beast: animals, pain and humanity in the Victorian mind*. Baltimore, MD: John Hopkins University Press.

Utah Museum of Fine Arts [UMFA] (2015) *Robert Smithson* [online]. [Accessed 18 December 2015]. Available from: http://umfa.utah.edu/land_art_spiraljetty.

Valentine, G. (2013) Tell me about…using interviews as a research methodology. In: Flowerdew, R. and Martin, D. (eds.) *Methods in human geography: a guide of students doing a research project*. 2nd edition, Abingdon: Routledge, pp. 110–127

Vannini, P. (2015) Non-representational ethnography: new ways of animating lifeworlds. cultural geographies, **22**(2), pp. 317–327.

Victorian, A. (1999) *Mind controllers*. London: Satin Publications.

WAAG (2012) *Opening PostNatural organisms of the European Union* [online]. [Accessed 18 November 2015]. Available from: http://waag.org/en/event/opening-postnatural-organisms-european-union.

Walker, D. D. (2015) Atomic age rodents: in search of the first animals of the Anthropocene. *Society and Space* [online]. [Accessed 11 December 2015]. Available from: http://societyandspace.com/material/discussion-forum/greenhough-lorimer-and-yusoff-2015-ff-future-fossils-exhibition/walker-2015-atomic-age-rodents-future-fossil/.

Walker, R. (2002) *Left shift: radical art in 1970s Britain*. London: I.B. Tauris.

Waquant, L. (2016) *Closing discussion remarks – Bourdieu, Space & Geography: Fieldwork Reflections & Theoretical Innovations*. American Association of Geographers Annual Meeting, Hilton Hotel, San Francisco, 29 March–2 April 2016.

Ward, M. (2014) The art of writing place, *Geography Compass*, **8**(10), pp. 755–766.

Warren, S. (2012) Audiencing James Turrell's *Skyspace*: encounters between art and audience at Yorkshire Sculpture Park. *cultural geographies*, **20**(1), pp. 83–102.

Watson, R. (2009) Mapping and contemporary art. *The Cartographic Journal*, **46**(4), pp. 293–307.

Weschler, L. (1995) *Mr. Wilson's Cabinet of Wonders*. New York: Pantheon Books

Weyergraf-Serra, C. and Buskirk, M. (eds.) (1991) *The destruction of tilted arc: documents*. Cambridge, MA: The MIT Press.

Whatmore, S. (2013) Earthly powers and affective environments: an ontological politics of flood risk. *Theory, Culture & Society*, **30**(7-8), pp. 33–50.

Whatmore, S. and Landström, C. (2011) Flood apprentices: an exercise in making things public. *Economy and Society*, **40**(4), pp. 582–610.

White, N. (2011) *Exploring dark places* [online]. [Accessed 11 January 2016]. Available from: http://eprints.bournemouth.ac.uk/19599/4/Exploring_Dark_PlacesV3-2-2-11.docx.pdf.

White, N. (2013a) Experiments and archives in the expanded field. In: Vaknin, J., Stuckey, K. and Lane, V. (eds.) *All this stuff: archiving the artist.* Faringdon: Libri Publishing, pp. 47–62.

White, N. (2013b) Epistemic events. In: Schwab, M. (ed.) *Experimental systems: future knowledge in artistic research*. Leuven: Leuven University Press, pp. 188–197.

White, N. (2014) *The office of experiments: experimental research in the expanded field of contemporary art*. Ph.D. thesis, Bournemouth University.

White, N. and Rowell, S. (2016) Overt research: fieldwork and transparency. In: Williams, A. J., Jenkings, K. N., Rech, M. F. and Woodward, R. (eds.) *The Routledge companion to military research methods*. Abingdon: Routledge, pp. 387–390.

Winter, A. (2005) The making of 'truth serum', 1920-1940. *Bulletin of the History of Medicine*, **79**(3), pp. 500-533.

Williams, A. (2012) *Geographies of faith, welfare and substance abuse: from neoliberalism to postsecular ethics*. Ph.D. thesis, University of Exeter.

Williams, A. J., Jenkings, K. N., Rech, M. F. and Woodward, R. (2016) *The Routledge companion to military research methods*. Abingdon: Routledge.

Williams, N. (2016) Creative processes: from interventions in art to intervallic experiments through Bergson. *Environment and Planning A*, **48**(8), pp. 1–16.

Willig, C. (2014) Interpretation and analysis. In: Flick, U. (ed.) *The Sage handbook of qualitative data analysis*. London: Sage, pp. 136–149.

Wilson, S. (2002) *Information arts: intersections of art, science, and technology*. Cambridge, MA, and London: The MIT Press.

Winker, K. (2005) Bird collections: development and use of a scientific resource. *The Auk*, **122**(3), pp. 966–971.

Withers, C. W. J. (2002a) Constructing the geographical archive. *Area*, **34**(3), pp. 303–311.

Withers, C. W. J. (2002b) The geography of scientific knowledge. In: Rupke, N. A. (ed.) *Göttingen and the development of the natural sciences*. Göttingen: Wallstein Verlag, pp. 9–18.

Woodyer, T. and Geoghegan, H. (2013) (Re)enchanting geography? The nature of being critical and the character of critique in human geography. *Progress in Human Geography*, **37**(2), pp. 195–214.

Wright, G. (2014) A guide to the REF for the shameless academic. *The Guardian* [online], 12 December. [Accessed 30 May 2017]. Available from: https://www.theguardian.com/higher-education-network/2014/dec/12/research-excellence-framework-success-academic.

Wylie, J. (2005) A single day walking: narrating self and landscape on the South West Coastal Path. *Transactions of the Institute of British Geographers*, **30**(2), pp. 234–247.

Wynne, B. (1992a) Uncertainty and environmental learning: reconceiving science and policy in the preventive paradigm. *Global Environmental Change*, **2**(2), pp. 111–127.

Wynne, B. (1992b) Misunderstood misunderstanding: social identities and public uptake of science. *Public Understanding of Science*, **1**(3), pp. 281–304.

Yusoff, K (2007) Antarctic exposure: archives of the feeling body. *cultural geographies*, **14**(2), pp. 211–233.